ALGEBRA

II

The University of the State of New York
REGENTS HIGH SCHOOL EXAMINATION

ALGEBRA II

Thursday, January 22, 2026 — 1:15 to 4:15 p.m., only

Student Name _____

School Name _____

The possession or use of any communications device is strictly prohibited when taking this examination. If you have or use any communications device, no matter how briefly, your examination will be invalidated and no score will be calculated for you.

Print your name and the name of your school on the lines above.

A separate answer sheet for **Part I** has been provided to you. Follow the instructions from the proctor for completing the student information on your answer sheet.

This examination has four parts, with a total of 37 questions. You must answer all questions in this examination. Record your answers to the Part I multiple-choice questions on the separate answer sheet. Write your answers to the questions in **Parts II, III,** and **IV** directly in this booklet. All work should be written in pen, except graphs and drawings, which should be done in pencil. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale.

The formulas that you may need to answer some questions in this examination are found at the end of the examination. This sheet is perforated so you may remove it from this booklet.

Scrap paper is not permitted for any part of this examination, but you may use the blank spaces in this booklet as scrap paper. A perforated sheet of scrap graph paper is provided at the end of this booklet for any question for which graphing may be helpful but is not required. You may remove this sheet from this booklet. Any work done on this sheet of scrap graph paper will not be scored.

When you have completed the examination, you must sign the statement printed at the end of the answer sheet, indicating that you had no unlawful knowledge of the questions or answers prior to the examination and that you have neither given nor received assistance in answering any of the questions during the examination. Your answer sheet cannot be accepted if you fail to sign this declaration.

Notice ...

A graphing calculator and a straightedge (ruler) must be available for you to use while taking this examination.

DO NOT OPEN THIS EXAMINATION BOOKLET UNTIL THE SIGNAL IS GIVEN.

Part I

Answer all 24 questions in this part. Each correct answer will receive 2 credits. No partial credit will be allowed. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. For each statement or question, choose the word or expression that, of those given, best completes the statement or answers the question. Record your answers on your separate answer sheet. [48]

Use this space for computations.

1 The value of t in the equation $27^{6-t} = 9^{t-1}$ is

(1) $\frac{7}{2}$

(2) $\frac{19}{5}$

(3) 8

(4) 4

2 Which expression is equivalent to $(x-4)^2 - 5(x-4) + 6$?

(1) $(x-2)(x-1)$

(2) $(x+2)(x-3)$

(3) $(x-10)(x-5)$

(4) $(x-6)(x-7)$

Use this space for computations.

3 Researchers wanted to determine if listening to classical music can reduce math anxiety. They divided 100 students randomly into two groups and put them in identical rooms. Both groups completed a math test and a survey rating their level of math anxiety. One group then listened to classical music for 10 minutes while the other group sat quietly. Both groups then took another math test, rated their level of math anxiety, and the researchers compared their results. Is this an observational study or an experiment?

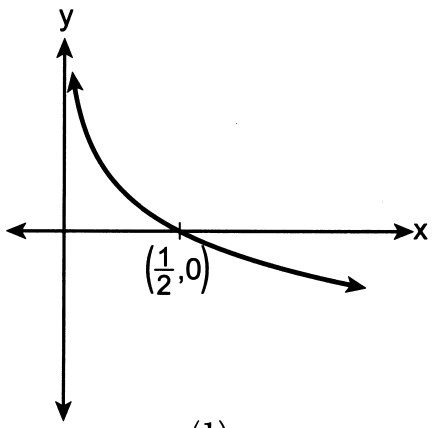
(1) It is an observational study because the participants completed a survey about math anxiety.

(2) It is an observational study because the researchers watched the participants take math tests.

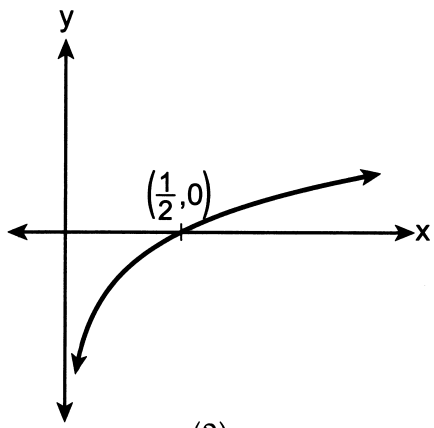
(3) It is an experiment because one group was randomly assigned to listen to classical music while the other group was not.

(4) It is an experiment because the participants took a math test.

4 Which graph represents the function $y = \log_{\frac{1}{2}}(x)$?



(1)



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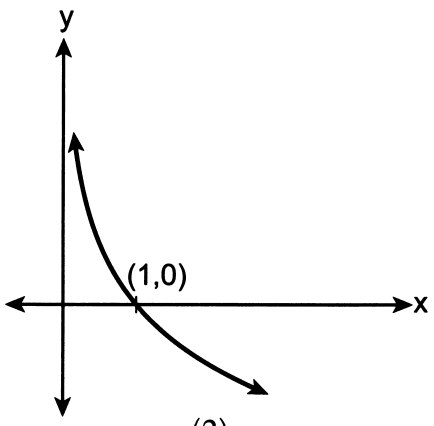

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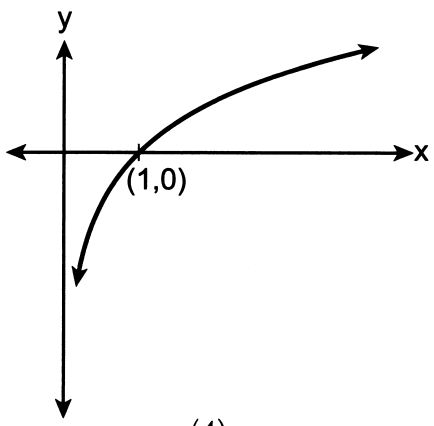
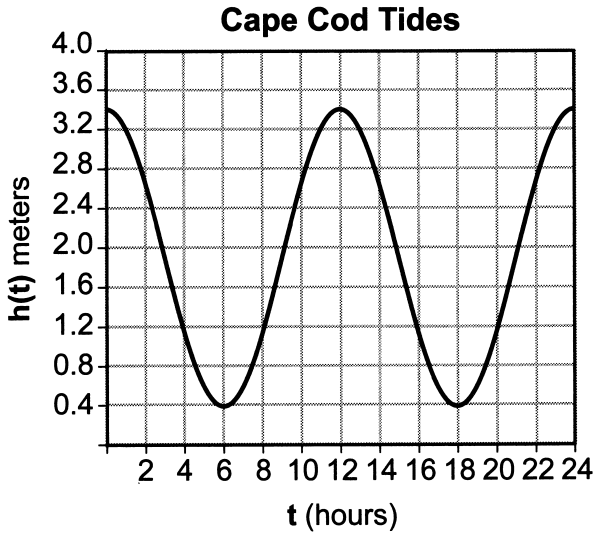


(4)

Use this space for computations.

5 The height of the water at Cape Cod, Massachusetts, is shown on the graph below.



If the height of the water, $h(t)$, is measured in meters and time, t, is measured in hours since high tide, what is an equation for the height of the water?

(1) $h(t) = 1.9\cos\left(\frac{\pi}{6}t\right) + 1.5$

(2) $h(t) = 1.5\cos\left(\frac{\pi}{6}t\right) + 1.9$

(3) $h(t) = 1.9\cos\left(\frac{\pi}{12}t\right) + 1.5$

(4) $h(t) = 1.5\cos\left(\frac{\pi}{12}t\right) + 1.9$

6 The solutions to $3x^2 - 4x + 2 = 0$ are

(1) $x = \frac{2}{3} \pm \frac{\sqrt{2}}{3}i$

(2) $x = \frac{2}{3} \pm \frac{\sqrt{10}}{3}$

(3) $x = \frac{2}{3} \pm \frac{\sqrt{2}}{3}$

(4) $x = \frac{2}{3} \pm \frac{\sqrt{10}}{3}i$

Use this space for computations.

7 The value of $\sin\left(\frac{2\pi}{3}\right)$ is equivalent to

(1) $\sin\left(\frac{4\pi}{3}\right)$

(2) $\cos\left(\frac{\pi}{6}\right)$

(3) $\tan\left(\frac{\pi}{3}\right)$

(4) $\csc\left(\frac{2\pi}{3}\right)$

8 Given $f^{-1}(x) = \sqrt[3]{4x + 1}$, which function represents $f(x)$?

(1) $f(x) = \sqrt[3]{\frac{1}{4}x - 1}$

(2) $f(x) = (4x + 1)^3$

(3) $f(x) = \frac{1}{4}(x^3 - 1)$

(4) $f(x) = \frac{x^3}{4} - 1$

9 In order for a school to purchase graduation gowns, the heights of all of the high school seniors are recorded. The heights are approximately normally distributed with a mean of 64.7 inches and a standard deviation of 4.267 inches. If a senior is selected at random, what is the probability that this student has a height that falls between 65 and 68 inches?

(1) 0.085

(2) 0.177

(3) 0.252

(4) 0.271

Use this space for computations.

10 Consider the system of equations below.

$$(x + 1)^2 + (y - 4)^2 = 9$$
$$x = 2$$

The x-value and y-value of the solution of the system are

(1) one rational and one imaginary

(2) both rational

(3) one rational and one irrational

(4) both irrational

11 Which expressions are equivalent to $36x^4 - 9x^2$?

I. $x^2(6x + 3)(6x - 3)$

II. $36\left(x^2 - \frac{1}{2}\right)\left(x^2 + \frac{1}{2}\right)$

III. $9(2x^2 + x)(2x^2 - x)$

IV. $36x^2\left(x - \frac{1}{2}\right)\left(x + \frac{1}{2}\right)$

(1) I and II, only

(2) I and III, only

(3) I, II, and III, only

(4) I, III, and IV, only

12 A deposit of \$1250 is made into a savings account that earns 1.86% annual interest. The amount in this account at any time, t, in years, is modeled by $A(t) = 1250(1.0186)^t$. Which expression best models the equivalent monthly growth of the account?

(1) $1250(0.001550)^t$

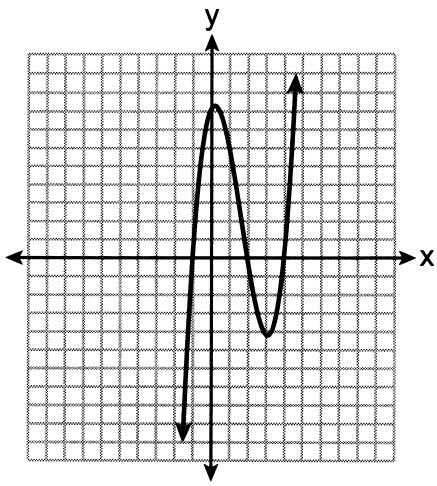
(2) $1250(0.001550)^{\frac{t}{12}}$

(3) $1250(1.001537)^{12t}$

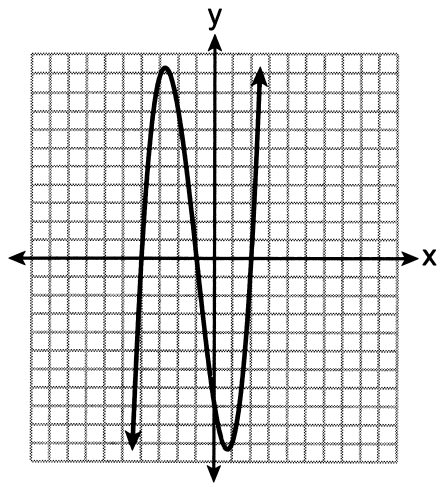
(4) $1250(1.001537)^{\frac{t}{12}}$

Use this space for computations.

13 Which graph represents a function that has a remainder of zero when divided by $(x - 4)$?



(1)



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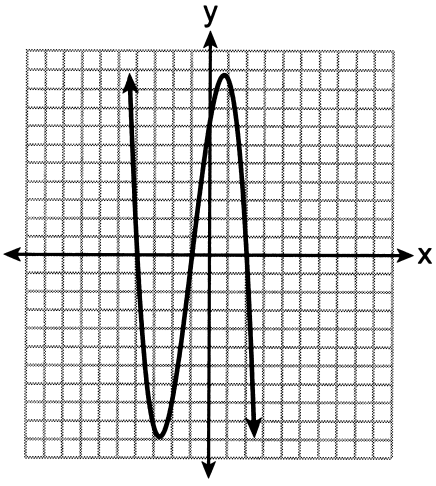

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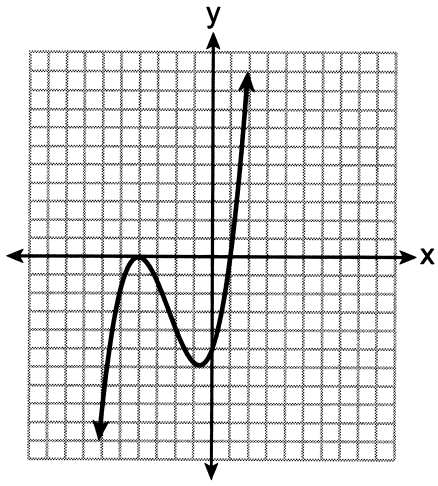


(4)

14 Given $a > 0$, which expression is equivalent to $\frac{\sqrt[3]{a} \cdot \sqrt[5]{a^2}}{\sqrt{a}}$?

(1) $a^{\frac{2}{13}}$

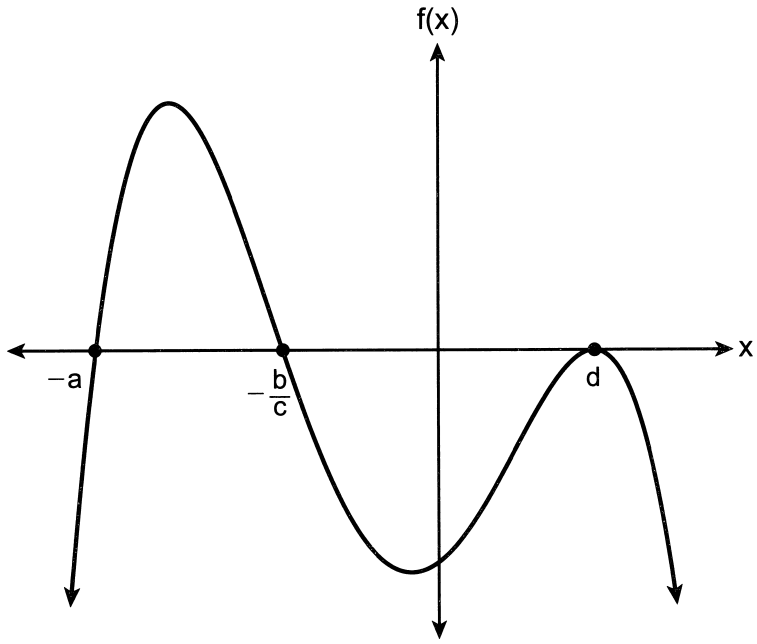
(2) $a^{\frac{7}{30}}$

(3) $a^{\frac{4}{15}}$

(4) $a^{\frac{7}{3}}$

Use this space for computations.

15 Which function could represent the sketch below, where a, b, c, and d are all greater than zero?



(1) $f(x) = -(x + a)(cx + b)(x - d)^2$

(2) $f(x) = -(x + a)(bx + c)(2x - d)$

(3) $f(x) = -(x - a)(cx - b)(x + d)^2$

(4) $f(x) = -(x - a)(bx - c)(2x + d)$

16 Before leaving for summer vacation, 447 students at a high school were asked whether or not they had a job for the summer. The results of the survey, broken down by the students' averages, are shown in the table below.

	Below 70%	70%–79%	80%–89%	90%–100%
Has a Job	35	73	78	52
Does Not Have a Job	42	62	70	35

The probability that a student has a job, given that the student's average is between 90% and 100%, rounded to the *nearest hundredth*, is

(1) 0.11

(2) 0.12

(3) 0.59

(4) 0.60

Use this space for computations.

17 The expression $\frac{3x^3 - 4x^2 - 17x + 6}{3x - 1}$, where $x \neq \frac{1}{3}$, is equivalent to

(1) $(x + 3)(x - 2)$

(2) $(x - 3)(x + 2)$

(3) $(x - 3)(x - 2)$

(4) $x^2 - x - 6 + \frac{12}{3x - 1}$

18 Three students put their first steps to solve the equation $x^2 - 4x = 9$ on the board at school.

Max	Gus	Rosie
$\sqrt{x^2 - 4x} = \sqrt{9}$	$x^2 - 4x$ ___ $= 9$ ___	$x(x - 4) = 9$
$x - 2x = 3$	$x^2 - 4x + 4 = 9 + 4$	$x = 9 \quad x - 4 = 9$

Correct steps are shown for

(1) Max, only

(2) Gus, only

(3) Max and Rosie, only

(4) Gus and Rosie, only

19 The average depreciation rate of a laptop is approximately 33.3% each year. If Garrett purchased a new laptop for \$700, which recursive formula represents the value of his laptop n years after it was purchased?

(1) $a_0 = 700$
$a_n = a_{n-1}(0.667)$

(2) $a_0 = 700$
$a_n = a_{n-1}(0.333)$

(3) $a_n = 700(0.667)^{n-1}$

(4) $a_n = 700(0.333)^{n-1}$

20 Given that the directrix of a parabola is $y = 7$ and its focus is 6 units vertically away from it, the vertex of this parabola could be the point

(1) (5,13)

(2) (2,1)

(3) (3,10)

(4) (4,6)

Use this space for computations.

21 How many values of x satisfy the equation $\frac{x}{x-1} = -|2x - 3| + 5$?

(1) 1

(2) 2

(3) 3

(4) 0

22 The tangent of an angle in standard position that terminates in Quadrant II is $-\sqrt{6}$. What is the cosine of this angle?

(1) $\frac{1}{\sqrt{6}}$

(2) $-\sqrt{7}$

(3) $-\frac{1}{37}$

(4) $-\frac{1}{\sqrt{7}}$

Use this space for computations.

23 Miranda joins a gym and pays an annual membership of \$400. Due to rising costs, the gym operator has told her the membership will increase 8% each year after the first year. How much will Miranda have paid in total, to the *nearest dollar*, if she is a member for 6 years?

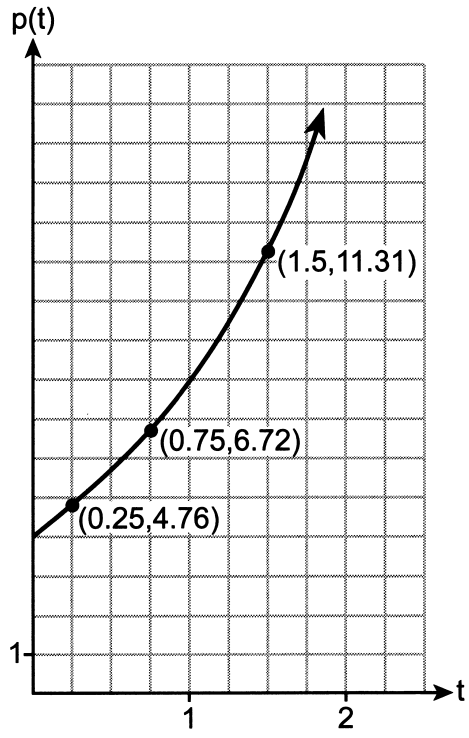
(1) 635

(2) 2592

(3) 2934

(4) 4320

24 Ms. Miles observed slides of bacteria under a microscope. She found that over a specific amount of time, t, in hours, the population was growing. She graphed the results of the population, $p(t)$, in thousands, of the bacteria over time on the graph below.



Assuming exponential growth, which statement is true?

(1) The population can be modeled by $p(t) = 2(4)^t$.

(2) The population can be modeled by $p(t) = 3.92t + 3.78$.

(3) The population approximately doubled every hour.

(4) The population approximately doubled every half hour.

Part II

Answer all 8 questions in this part. Each correct answer will receive 2 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil. [16]

25 The number of people at a concert t hours after the doors open can be modeled by the equation $B(t) = 250(1.8)^t$. Determine how much time, to the *nearest hundredth of an hour*, must pass before the number of people reaches 2000.

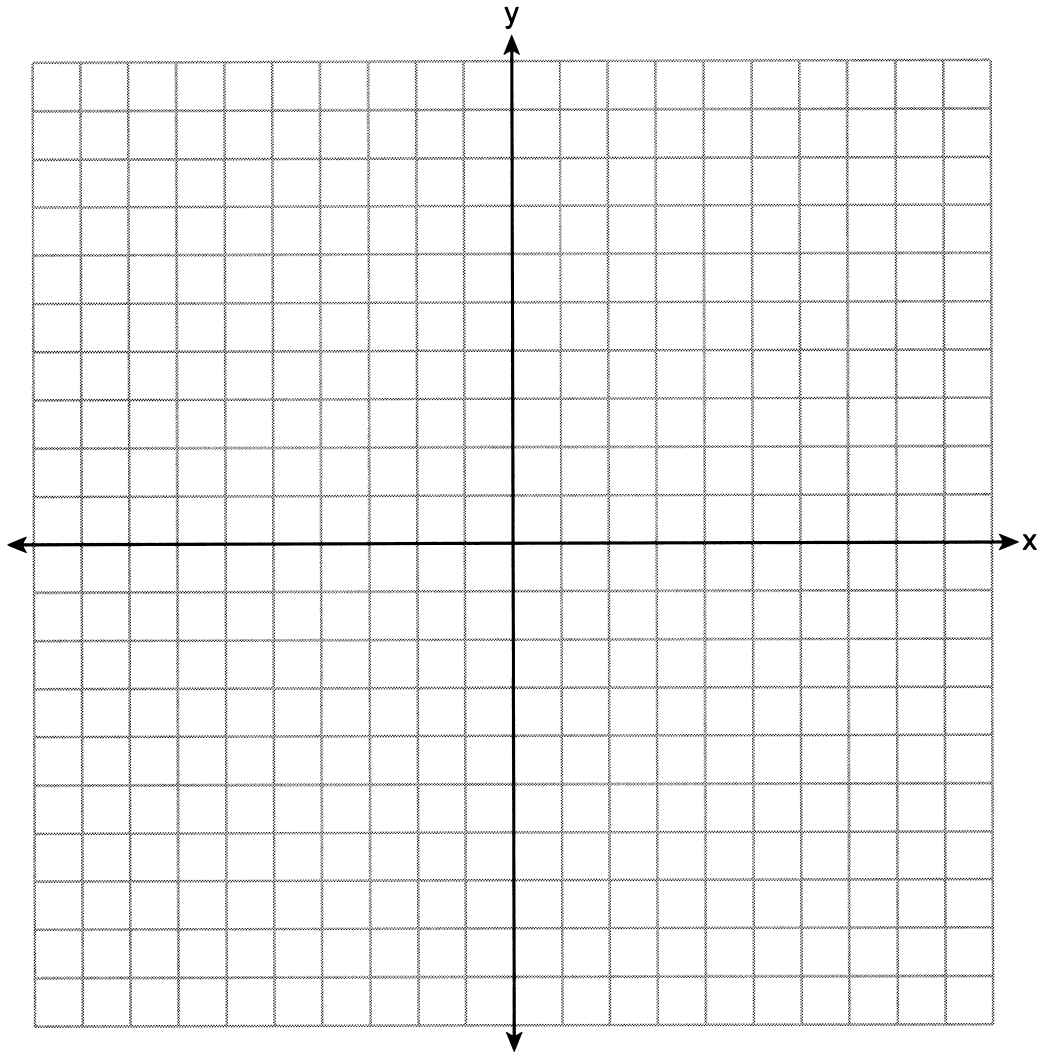
26 On a day in June 2017 on Staten Island, the function $T(h) = 8\sin\left(\frac{\pi}{12}h\right) + 82$ was used to model the temperature, T, in degrees Fahrenheit, h hours after 9 a.m.

State the value of $T(6)$ and explain its meaning in this context.

27 Use properties of exponents to show why $(-64)^{\frac{2}{3}} = 16$.

Justify your answer.

28 Graph $y = 2^x - 2$ on the axes below.



State the equation of the asymptote.

29 In a survey of students at a large high school, 58% speak English fluently, 24% speak Mandarin fluently, and 16% speak English and Mandarin fluently. Determine the percentage of students at the school who speak English or Mandarin fluently.

30 The following table represents the number of years after 1980, x, and the median value of a home in the United States in thousands of dollars, y.

x	1	10	20	30	40
y	59.07	97.02	131.6	180.7	269.2

Based on these data, write an exponential regression equation to model the median home value, in thousands of dollars, x years after 1980. Round all coefficients to the *nearest hundredth*.

31 Solve algebraically for all values of x that satisfy the equation below.

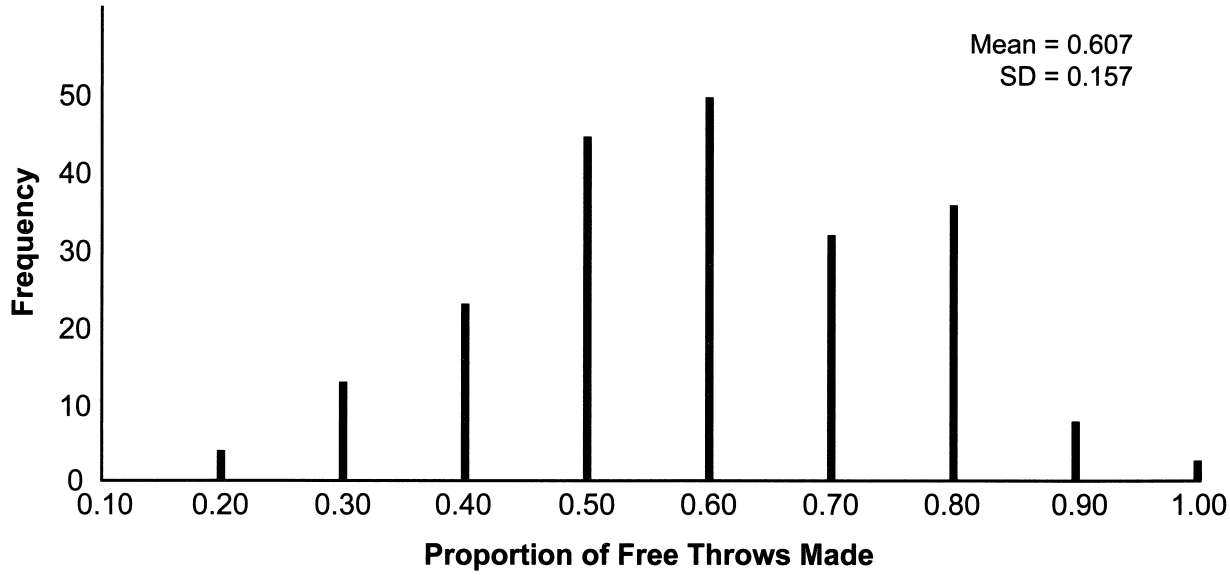
$$\frac{24}{x^2 + 4x} + \frac{x}{x + 4} = \frac{5}{x}$$

32 Express $i(x + i) - (x - i)^2$ in simplest $a + bi$ form.

Part III

Answer all 4 questions in this part. Each correct answer will receive 4 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil. [16]

33 On a high school basketball team, Alex typically makes 60% of his free throws. In the last four minutes of the game, Alex took 10 free throws and made 30% of them. Fans were saying he missed on purpose. A simulation was run of sample size 10, simulated 200 times, based on the premise that 60% of the free throws were made. The approximately normal results are shown below.



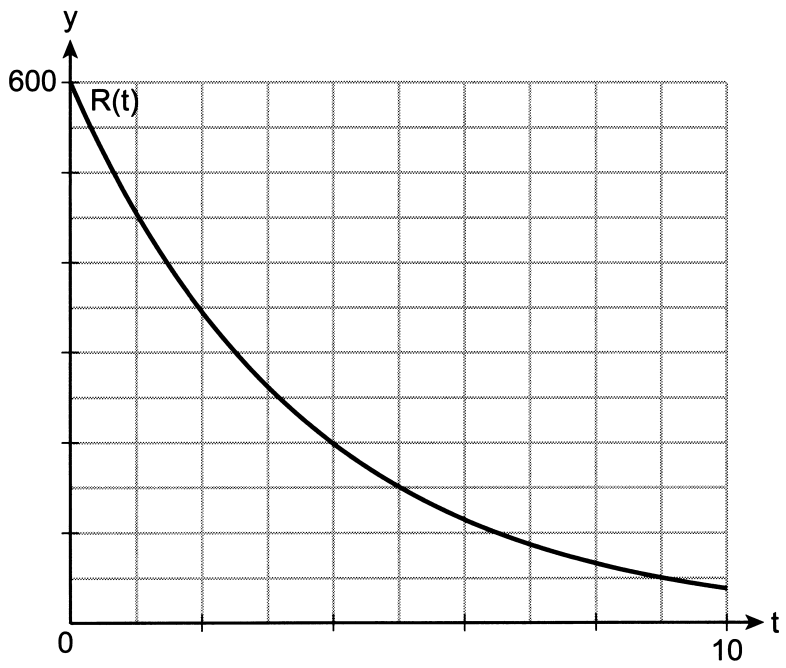
Based on the simulation, determine an interval containing the middle 95% of simulated values. State your answer to three decimal places.

Do the fans have a valid argument? Explain using statistical evidence.

34 The breakdown of a drug is modeled by $A(t) = A_0e^{-rt}$, where $A(t)$ is the amount of the drug in the body, A_0 is the initial dosage, r is the rate of decay, and t is the time in hours. A patient is given 450 mg of a drug that has a decay rate of 0.205. Write a function, $A(t)$, to model the amount of the drug remaining in the body after t hours.

The sketch below shows the function $R(t)$, which models the breakdown of a different drug administered to the same patient.

Graph $A(t)$ on the grid below.



Using the graph, approximate to the *nearest hour* when the patient has the same amount of both drugs remaining.

35 Consider the sinusoidal function below.

$$d(t) = 6800\cos\left(\frac{4}{3}\pi t\right) + 6400$$

State the maximum value of $d(t)$.

State the period of $d(t)$.

Determine the average rate of change from $\frac{3}{4} \leq t \leq 2$.

36 Solve algebraically for all values of m:

$$m - 2\sqrt{4m - 3} = 3$$

Part IV

Answer the question in this part. A correct answer will receive 6 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided to determine your answer. Note that diagrams are not necessarily drawn to scale. A correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil. [6]

37 Xander and Yvette are each practicing for their road tests. Xander decides to drive for 15 minutes the first day and plans to increase the amount of time he spends driving by five minutes each day leading up to the day of his test. Yvette decides to drive for 10 minutes the first day, and she plans to increase the amount of time she spends driving by 15% each day leading up to the day of her test.

State whose plan for the amount of time driving per day can be modeled by an arithmetic sequence, and whose plan can be modeled by a geometric sequence. Explain your reasoning.

Write an equation for x_n that represents the amount of time spent driving on the nth day for Xander's plan and an equation for y_n that represents the amount of time spent driving on the nth day for Yvette's plan.

Who will spend more time driving on the 19th day of practicing? Justify your answer.

The State Education Department / The University of the State of New York

Regents Examination in Algebra II – January 2026

Scoring Key: Part I (Multiple-Choice Questions)

Examination	Date	Question Number	Scoring Key	Question Type	Credit
Algebra II	January '26	**1**	4	MC	2
Algebra II	January '26	**2**	4	MC	2
Algebra II	January '26	**3**	3	MC	2
Algebra II	January '26	**4**	2	MC	2
Algebra II	January '26	**5**	2	MC	2
Algebra II	January '26	**6**	1	MC	2
Algebra II	January '26	**7**	2	MC	2
Algebra II	January '26	**8**	3	MC	2
Algebra II	January '26	**9**	3	MC	2
Algebra II	January '26	**10**	2	MC	2
Algebra II	January '26	**11**	4	MC	2
Algebra II	January '26	**12**	3	MC	2
Algebra II	January '26	**13**	1	MC	2
Algebra II	January '26	**14**	2	MC	2
Algebra II	January '26	**15**	1	MC	2
Algebra II	January '26	**16**	4	MC	2
Algebra II	January '26	**17**	2	MC	2
Algebra II	January '26	**18**	2	MC	2
Algebra II	January '26	**19**	1	MC	2
Algebra II	January '26	**20**	3	MC	2
Algebra II	January '26	**21**	3	MC	2
Algebra II	January '26	**22**	4	MC	2
Algebra II	January '26	**23**	3	MC	2
Algebra II	January '26	**24**	3	MC	2

Regents Examination in Algebra II – January 2026

Scoring Key: Parts II, III, and IV (Constructed-Response Questions)

Examination	Date	Question Number	Scoring Key	Question Type	Credit
Algebra II	January '26	**25**	-	CR	2
Algebra II	January '26	**26**	-	CR	2
Algebra II	January '26	**27**	-	CR	2
Algebra II	January '26	**28**	-	CR	2
Algebra II	January '26	**29**	-	CR	2
Algebra II	January '26	**30**	-	CR	2
Algebra II	January '26	**31**	-	CR	2
Algebra II	January '26	**32**	-	CR	2
Algebra II	January '26	**33**	-	CR	4
Algebra II	January '26	**34**	-	CR	4
Algebra II	January '26	**35**	-	CR	4
Algebra II	January '26	**36**	-	CR	4
Algebra II	January '26	**37**	-	CR	6

Key
MC = Multiple-choice question
CR = Constructed-response question

The chart for determining students' final examination scores for the **January 2026 Regents Examination in Algebra II** will be posted on the Department's web site at: https://www.nysedregents.org/algebratwo/ on the day of the examination. Conversion charts provided for the previous administrations of the Regents Examination in Algebra II must NOT be used to determine students' final scores for this administration.

FOR TEACHERS ONLY

The University of the State of New York
REGENTS HIGH SCHOOL EXAMINATION

ALGEBRA II

Thursday, January 22, 2026 — 1:15 to 4:15 p.m., only

RATING GUIDE

Updated information regarding the rating of this examination may be posted on the New York State Education Department's web site during the rating period. Check this web site at: https://www.nysed.gov/state-assessment/high-school-regents-examinations and select the link "Scoring Information" for any recently posted information regarding this examination. This site should be checked before the rating process for this examination begins and several times throughout the Regents Examination period.

The Department is providing supplemental scoring guidance, the "Model Response Set," for the Regents Examination in Algebra II. This guidance is intended to be part of the scorer training. Schools should use the Model Response Set along with the rubrics in the Rating Guide to help guide scoring of student work. While not reflective of all scenarios, the model responses selected for the Model Response Set illustrate how less common student responses to constructed-response questions may be scored. The Model Response Set will be available on the Department's web site at https://www.nysedregents.org/algebratwo/.

Mechanics of Rating

The following procedures are to be followed for scoring student answer papers for the Regents Examination in Algebra II. More detailed information about scoring is provided in the publication *Directions for Scoring Regents Examinations*.

Do *not* attempt to correct the student's work by making insertions or changes of any kind. In scoring the constructed-response questions, use check marks to indicate student errors. Unless otherwise specified, mathematically correct variations in the answers will be allowed. Units need not be given when the wording of the questions allows such omissions.

Each student's answer paper is to be scored by a minimum of three mathematics teachers. No one teacher is to score more than approximately one-third of the constructed-response questions on a student's paper. Teachers may not score their own students' answer papers. On the student's separate answer sheet, for each question, record the number of credits earned and the teacher's assigned rater/scorer letter.

Schools are not permitted to rescore any of the constructed-response questions on this exam after each question has been rated once, regardless of the final exam score. Schools are required to ensure that the raw scores have been added correctly and that the resulting scale score has been determined accurately.

Raters should record the student's scores for all questions and the total raw score on the student's separate answer sheet. Then the student's total raw score should be converted to a scale score by using the conversion chart that will be posted on the Department's web site at: https://www.nysed.gov/state-assessment/high-school-regents-examinations by Thursday, January 22, 2026. Because scale scores corrsponding to raw scores in the conversion chart may change from one administration to another, it is crucial that, for each administration, the conversion chart provided for that administration be used to determine the student's final score. The student's scale score should be entered in the box provided on the student's separate answer sheet. The scale score is the student's final examination score.

General Rules for Applying Mathematics Rubrics

I. General Principles for Rating

The rubrics for the constructed-response questions on the Regents Examination in Algebra II are designed to provide a systematic, consistent method for awarding credit. The rubrics are not to be considered all-inclusive; it is impossible to anticipate all the different methods that students might use to solve a given problem. Each response must be rated carefully using the teacher's professional judgment and knowledge of mathematics; all calculations must be checked. The specific rubrics for each question must be applied consistently to all responses. In cases that are not specifically addressed in the rubrics, raters must follow the general rating guidelines in the publication *Directions for Scoring Regents Examinations*, use their own professional judgment, confer with other mathematics teachers, and/or contact the State Education Department for guidance. During each Regents Examination administration period, rating questions may be referred directly to the Education Department. The contact numbers are sent to all schools before each administration period.

II. Full-Credit Responses

A full-credit response provides a complete and correct answer to all parts of the question. Sufficient work is shown to enable the rater to determine how the student arrived at the correct answer.

When the rubric for the full-credit response includes one or more examples of an acceptable method for solving the question (usually introduced by the phrase "such as"), it does not mean that there are no additional acceptable methods of arriving at the correct answer. Unless otherwise specified, mathematically correct alternative solutions should be awarded credit. The only exceptions are those questions that specify the type of solution that must be used; e.g., an algebraic solution or a graphic solution. A correct solution using a method other than the one specified is awarded half the credit of a correct solution using the specified method.

III. Appropriate Work

Full-Credit Responses: The directions in the examination booklet for all the constructed-response questions state: "Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc." The student has the responsibility of providing the correct answer ***and*** showing how that answer was obtained. The student must "construct" the response; the teacher should not have to search through a group of seemingly random calculations scribbled on the student paper to ascertain what method the student may have used.

Responses With Errors: Rubrics that state "Appropriate work is shown, but…" are intended to be used with solutions that show an essentially complete response to the question but contain certain types of errors, whether computational, rounding, graphing, or conceptual. If the response is incomplete; i.e., an equation is written but not solved or an equation is solved but not all of the parts of the question are answered, appropriate work has ***not*** been shown. Other rubrics address incomplete responses.

IV. Multiple Errors

Computational Errors, Graphing Errors, and Rounding Errors: Each of these types of errors results in a 1-credit deduction. Any combination of two of these types of errors results in a 2-credit deduction. No more than 2 credits should be deducted for such mechanical errors in a 4-credit question and no more than 3 credits should be deducted in a 6-credit question. The teacher must carefully review the student's work to determine what errors were made and what type of errors they were.

Conceptual Errors: A conceptual error involves a more serious lack of knowledge or procedure. Examples of conceptual errors include using the incorrect formula for the area of a figure, choosing the incorrect trigonometric function, or multiplying the exponents instead of adding them when multiplying terms with exponents.

If a response shows repeated occurrences of the same conceptual error, the student should not be penalized twice. If the same conceptual error is repeated in responses to other questions, credit should be deducted in each response.

For 4- and 6-credit questions, if a response shows one conceptual error and one computational, graphing, or rounding error, the teacher must award credit that takes into account both errors. Refer to the rubric for specific scoring guidelines.

Part II

For each question, use the specific criteria to award a maximum of 2 credits. Unless otherwise specified, mathematically correct alternative solutions should be awarded appropriate credit.

(25) **[2]** 3.54, and correct work is shown.

[1] Appropriate work is shown, but one computational or rounding error is made.

or

[1] Appropriate work is shown, but one conceptual error is made.

or

[1] 3.54, but no work is shown.

[0] A zero response does not contain enough relevant course-level work to receive any credit, does not satisfy the criteria for one or more credits, or is a correct response that was obtained by an obviously incorrect procedure.

(26) **[2]** 90, and a correct explanation is written.

[1] One computational error is made.

or

[1] One conceptual error is made.

or

[1] An appropriate explanation is written, but no further correct work is shown.

or

[1] 90, but the explanation is incomplete, incorrect, or missing.

[0] A zero response does not contain enough relevant course-level work to receive any credit, does not satisfy the criteria for one or more credits, or is a correct response that was obtained by an obviously incorrect procedure.

(27) **[2]** A correct justification using properties of exponents is given.

[1] Appropriate work is shown, but one computational error is made.

or

[1] Appropriate work is shown, but one conceptual error is made.

or

[1] An incomplete justification is given.

[0] A zero response does not contain enough relevant course-level work to receive any credit, does not satisfy the criteria for one or more credits, or is a correct response that was obtained by an obviously incorrect procedure.

(28) **[2]** A correct graph is drawn, and $y = -2$ is stated.

[1] Appropriate work is shown, but one or more graphing errors are made.

or

[1] Appropriate work is shown, but one conceptual error is made.

or

[1] A correct graph is drawn, but no further correct work is shown.

or

[1] $y = -2$ is written, but no further correct work is shown.

[0] A zero response does not contain enough relevant course-level work to receive any credit, does not satisfy the criteria for one or more credits, or is a correct response that was obtained by an obviously incorrect procedure.

(29) **[2]** 66, and correct work is shown.

[1] Appropriate work is shown, but one computational error is made.

or

[1] Appropriate work is shown, but one conceptual error is made.

or

[1] 66, but no work is shown.

[0] A zero response does not contain enough relevant course-level work to receive any credit, does not satisfy the criteria for one or more credits, or is a correct response that was obtained by an obviously incorrect procedure.

(30) **[2]** $y = 61.14(1.04)^x$ or equivalent.

[1] One computational or rounding error is made.

or

[1] One conceptual error is made.

or

[1] The expression $61.14(1.04)^x$ or equivalent is written.

[0] A zero response does not contain enough relevant course-level work to receive any credit, does not satisfy the criteria for one or more credits, or is a correct response that was obtained by an obviously incorrect procedure.

(31) **[2]** 1 and 4, and correct algebraic work is shown.

[1] Appropriate work is shown, but one computational or factoring error is made.

or

[1] Appropriate work is shown, but one conceptual error is made.

or

[1] A correct polynomial equation in standard form is written, but no further correct work is shown.

or

[1] 1 and 4, but a method other than algebraic is used.

or

[1] 1 and 4, but no work is shown.

[0] A zero response does not contain enough relevant course-level work to receive any credit, does not satisfy the criteria for one or more credits, or is a correct response that was obtained by an obviously incorrect procedure.

(32) **[2]** $-x^2 + 3xi$ or equivalent in $a + bi$ form, and correct work is shown.

[1] Appropriate work is shown, but one computational or simplification error is made.

or

[1] Appropriate work is shown, but one conceptual error is made.

or

[1] $-x^2 + 3xi$, but no work is shown.

[0] A zero response does not contain enough relevant course-level work to receive any credit, does not satisfy the criteria for one or more credits, or is a correct response that was obtained by an obviously incorrect procedure.

Part III

For each question, use the specific criteria to award a maximum of 4 credits. Unless otherwise specified, mathematically correct alternative solutions should be awarded appropriate credit.

(33) **[4]** A correct interval is determined such as (0.293, 0.921) and a negative response is indicated with a correct statistical explanation.

[3] Appropriate work is shown, but one computational or rounding error is made.

or

[3] Appropriate work is shown, but the explanation is incomplete or not statistical.

[2] Appropriate work is shown, but two or more computational or rounding errors are made.

or

[2] Appropriate work is shown to find (0.293, 0.921), but no further correct work is shown.

or

[2] No, and a correct statistical explanation is written, but no further correct work is shown.

[1] (0.293, 0.921), but no work is shown.

[0] No, but no statistical explanation is written.

or

[0] A zero response does not contain enough relevant course-level work to receive any credit, does not satisfy the criteria for one or more credits, or is a correct response that was obtained by an obviously incorrect procedure.

(34) **[4]** $A(t) = 450e^{-0.205t}$, a correct graph is drawn, and 4 is stated.

[3] Appropriate work is shown, but one graphing or notation error is made.

[2] Appropriate work is shown, but two or more graphing or notation errors are made.

or

[2] A correct graph is drawn, but no further correct work is shown.

[1] $A(t) = 450e^{-0.205t}$ is written or 4 is stated, but no further correct work is shown.

[0] A zero response does not contain enough relevant course-level work to receive any credit, does not satisfy the criteria for one or more credits, or is a correct response that was obtained by an obviously incorrect procedure.

(35) **[4]** 13,200, $\frac{3}{2}$ or equivalent, and 2720, and correct work is shown.

[3] Appropriate work is shown, but one computational error is made.

[2] Appropriate work is shown, but two computational errors are made.

or

[2] Appropriate work is shown to find 2720, but no further correct work is shown.

[1] 13,200 or $\frac{3}{2}$ is stated, but no further correct work is shown.

or

[1] 2720, but no further correct work is shown.

[0] A zero response does not contain enough relevant course-level work to receive any credit, does not satisfy the criteria for one or more credits, or is a correct response that was obtained by an obviously incorrect procedure.

(36) **[4]** 21, and correct algebraic work is shown.

[3] Appropriate work is shown, but one computational or factoring error is made.

or

[3] 21, and appropriate work is shown, but 1 is not rejected.

[2] Appropriate work is shown, but two computational or factoring errors are made.

or

[2] Appropriate work is shown, but one conceptual error is made.

or

[2] A correct quadratic equation in standard form is written, but no further correct work is shown.

or

[2] 21, but a method other than algebraic is used.

[1] Appropriate work is shown, but one conceptual error and one computational or factoring error are made.

or

[1] 21, but no work is shown.

[0] A zero response does not contain enough relevant course-level work to receive any credit, does not satisfy the criteria for one or more credits, or is a correct response that was obtained by an obviously incorrect procedure.

Part IV

For this question, use the specific criteria to award a maximum of 6 credits. Unless otherwise specified, mathematically correct alternative solutions should be awarded appropriate credit.

(37) **[6]** Xander's plan is arithmetic and Yvette's plan is geometric, and a correct explanation is written, $x_n = 15 + (n - 1)(5)$, $y_n = 10(1.15)^{n-1}$ or equivalent equations are written, Yvette, and a correct justification is provided.

[5] Appropriate work is shown, but one computational or notation error is made.

[4] Appropriate work is shown, but two computational or notation errors are made.

[3] Appropriate work is shown, but three or more computational or notation errors are made.

[2] Xander's equation is arithmetic and Yvette's equation is geometric, and a correct explanation is written, but no further correct work is shown.

or

[2] Correct equations for x_n and y_n are written, but no further correct work is shown.

or

[2] Yvette is indicated as spending more time driving on day 19 and a correct justification is given, but no further correct work is shown.

[1] Xander's equation is arithmetic or Yvette's equation is geometric, and a correct explanation is written, but no further correct work is shown.

or

[1] An equation for either x_n or y_n is written correctly.

[0] Xander's equation is arithmetic and Yvette's equation is geometric, but no further correct work is shown.

or

[0] Yvette is indicated as spending more time driving on day 19, but no justification is given.

or

[0] A zero response does not contain enough relevant course-level work to receive any credit, does not satisfy the criteria for one or more credits, or is a correct response that was obtained by an obviously incorrect procedure.

Map to the Learning Standards
Algebra II
January 2026

Question	Type	Credits	Cluster
1	Multiple Choice	2	F-LE.A
2	Multiple Choice	2	A-SSE.A
3	Multiple Choice	2	S-IC.B
4	Multiple Choice	2	F-IF.C
5	Multiple Choice	2	F-TF.B
6	Multiple Choice	2	N-CN.C
7	Multiple Choice	2	F-TF.A
8	Multiple Choice	2	F-BF.B
9	Multiple Choice	2	S-ID.A
10	Multiple Choice	2	A-REI.C
11	Multiple Choice	2	A-SSE.A
12	Multiple Choice	2	A-SSE.B
13	Multiple Choice	2	A-APR.B
14	Multiple Choice	2	N-RN.A
15	Multiple Choice	2	F-IF.B
16	Multiple Choice	2	S-CP.A
17	Multiple Choice	2	A-APR.D
18	Multiple Choice	2	A-REI.B
19	Multiple Choice	2	F-BF.A
20	Multiple Choice	2	G-GPE.A

21	Multiple Choice	2	A-REI.D
22	Multiple Choice	2	F-TF.C
23	Multiple Choice	2	A-SSE.B
24	Multiple Choice	2	F-LE.B
25	Constructed Response	2	A-CED.A
26	Constructed Response	2	N-Q.A
27	Constructed Response	2	N-RN.A
28	Constructed Response	2	F-IF.C
29	Constructed Response	2	S-CP.B
30	Constructed Response	2	S-ID.B
31	Constructed Response	2	A-REI.A
32	Constructed Response	2	N-CN.A
33	Constructed Response	4	S-IC.B
34	Constructed Response	4	A-REI.D
35	Constructed Response	4	F-IF.B
36	Constructed Response	4	A-REI.A
37	Constructed Response	6	F-BF.A

The *Chart for Determining the Final Examination Score for the January 2026 Regents Examination in Algebra II* will be posted on the Department's web site at: https://www.nysed.gov/state-assessment/high-school-regents-examinations on the day of the examination. Conversion charts provided for previous administrations of the Regents Examination in Algebra II must NOT be used to determine students' final scores for this administration.

Online Submission of Teacher Evaluations of the Test to the Department

Suggestions and feedback from teachers provide an important contribution to the test development process. The Department provides an online evaluation form for State assessments. It contains spaces for teachers to respond to several specific questions and to make suggestions. Instructions for completing the evaluation form are as follows:

1. Go to https://www.nysed.gov/state-assessment/teacher-feedback-state-assessments.

2. Click Regents Examinations.

3. Complete the required demographic fields.

4. Select the test title from the Regents Examination dropdown list.

5. Complete each evaluation question and provide comments in the space provided.

6. Click the SUBMIT button at the bottom of the page to submit the completed form.

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

ALGEBRA II

Thursday, January 22, 2026 — 1:15 to 4:15 p.m., only

MODEL RESPONSE SET

Table of Contents

Question 25

25 The number of people at a concert t hours after the doors open can be modeled by the equation $B(t) = 250(1.8)^t$. Determine how much time, to the *nearest hundredth of an hour*, must pass before the number of people reaches 2000.

$2000 = 250(1.8)^t$

$8 = 1.8^t$

$\frac{\log 8}{\log 1.8} = \frac{t \log 1.8}{\log 1.8}$

$t = 3.54$ hours

Score 2: The student gave a complete and correct response.

Question 25

25 The number of people at a concert t hours after the doors open can be modeled by the equation $B(t) = 250(1.8)^t$. Determine how much time, to the *nearest hundredth of an hour*, must pass before the number of people reaches 2000.

$250(1.8)^3 = 1458$

$250(1.8)^{3.5} = 1956.112267$

$250(1.8)^{3.53} = 1990.911484$

$250(1.8)^{3.54} = 2002.648256$

$3.54 = t$

Score 2: The student gave a complete and correct response.

Question 25

25 The number of people at a concert t hours after the doors open can be modeled by the equation $B(t) = 250(1.8)^t$. Determine how much time, to the *nearest hundredth of an hour*, must pass before the number of people reaches 2000.

$B(t) = 250(1.8)^t$

$B(t) = 450^t$

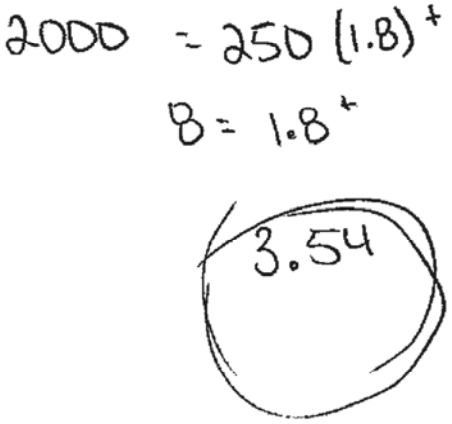
$\frac{\log 2000}{\log 450} = \frac{t \log 450}{\log 450}$

$1.24 = t$

Score 1: The student made a conceptual error.

Question 25

25 The number of people at a concert t hours after the doors open can be modeled by the equation $B(t) = 250(1.8)^t$. Determine how much time, to the *nearest hundredth of an hour*, must pass before the number of people reaches 2000.



Score 1: The student did not show enough relevant course-level correct work to receive full credit.

Question 25

25 The number of people at a concert t hours after the doors open can be modeled by the equation $B(t) = 250(1.8)^t$. Determine how much time, to the *nearest hundredth of an hour*, must pass before the number of people reaches 2000.

$\frac{B(t)}{250} = \frac{250(1.8)^t}{250}$

$250 = 1.8^t$

$\frac{\log 250}{\log 1.8} = \frac{t \log 1.8}{\log 1.8}$

$9.394 = t$

Score 0: The student made multiple errors.

Question 26

26 On a day in June 2017 on Staten Island, the function $T(h) = 8\sin\left(\frac{\pi}{12}h\right) + 82$ was used to model the temperature, T, in degrees Fahrenheit, h hours after 9 a.m.

State the value of $T(6)$ and explain its meaning in this context.

$T(6) = 8\sin\left(\frac{6\pi}{12}\right) + 82$

$T(6) = 8\sin\left(\frac{\pi}{2}\right) + 82$

$T(6) = 90$

T(6) means that at 3pm, the temperature reaches its maximum value of 90° F.

Score 2: The student gave a complete and correct response.

Question 26

26 On a day in June 2017 on Staten Island, the function $T(h) = 8\sin\left(\frac{\pi}{12}h\right) + 82$ was used to model the temperature, T, in degrees Fahrenheit, h hours after 9 a.m.

State the value of $T(6)$ and explain its meaning in this context.

T(6) = Temp 6 hours after the ninth hour.

Here's T(6) solved: $8\sin\left(\frac{\pi}{12}6\right)+82=$

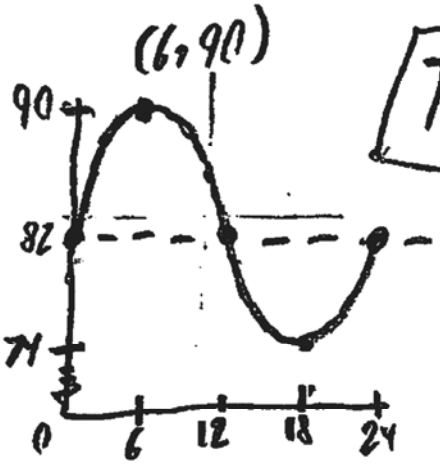
90 Fahrenheit

Score 2: The student gave a complete and correct response.

Question 26

26 On a day in June 2017 on Staten Island, the function $T(h) = 8\sin\left(\frac{\pi}{12}h\right) + 82$ was used to model the temperature, T, in degrees Fahrenheit, h hours after 9 a.m.

State the value of $T(6)$ and explain its meaning in this context.



T(6) = 90

$p = \frac{2\pi}{\frac{\pi}{12}} = 24$

amp = 8

mid = 82

min = 74

max = 90

T(6) is the maximum

Score 1: The student wrote an explanation without context.

Question 26

26 On a day in June 2017 on Staten Island, the function $T(h) = 8\sin\left(\frac{\pi}{12}h\right) + 82$ was used to model the temperature, T, in degrees Fahrenheit, h hours after 9 a.m.

State the value of $T(6)$ and explain its meaning in this context.

$T(h) = 8\sin\left(\frac{\pi}{12}h\right) + 82$

$T(6) = 8\sin\left(\frac{\pi}{12}(6)\right) + 82$

$T(6) \approx 82°$

This value expresses that it was approximately 82° F at around 3:00 P.M. on a day in June 2017.

Score 1: The student did not evaluate using radians.

Question 26

26 On a day in June 2017 on Staten Island, the function $T(h) = 8\sin\left(\frac{\pi}{12}h\right) + 82$ was used to model the temperature, T, in degrees Fahrenheit, h hours after 9 a.m.

State the value of $T(6)$ and explain its meaning in this context.

$T(6) = 8\sin\left(\frac{\pi}{12}(6)\right) + 82$

$T(6) = 82.22$

the predicted temperature is 82.22°F

Score 0: The student made one computational error and wrote an incomplete explanation.

Question 27

27 Use properties of exponents to show why $(-64)^{\frac{2}{3}} = 16$.

Justify your answer.

$\frac{1}{3} \cdot \frac{2}{1}$

$(-64)^{\frac{2}{3}} = 16$

$((-64)^{2})^{1/3} = 16$

$4096^{1/3} = 16$

$16 = 16$

Score 2: The student gave a complete and correct response.

Question 27

27 Use properties of exponents to show why $(-64)^{\frac{2}{3}} = 16$.

Justify your answer.

$\sqrt[3]{(-64)^2}$

$\sqrt[3]{4096}$

16

Score 2: The student gave a complete and correct response.

Question 27

27 Use properties of exponents to show why $(-64)^{\frac{2}{3}} = 16$.

Justify your answer.

$(-64)^{2/3} = 16$

$(-64^2)^{1/3} = 16$

$(4096)^{1/3} = 16$

$16 = 16$

Score 1: The student made one computational error.

Question 27

27 Use properties of exponents to show why $(-64)^{\frac{2}{3}} = 16$.

Justify your answer.

$\left((-64)^{\frac{1}{3}}\right)^2$ $(-64)^{\frac{2}{3}}$ does not equal 16

$(-4)^2$

$16 \neq 16$.

Score 1: The student made one computational error.

Question 27

27 Use properties of exponents to show why $(-64)^{\frac{2}{3}} = 16$.

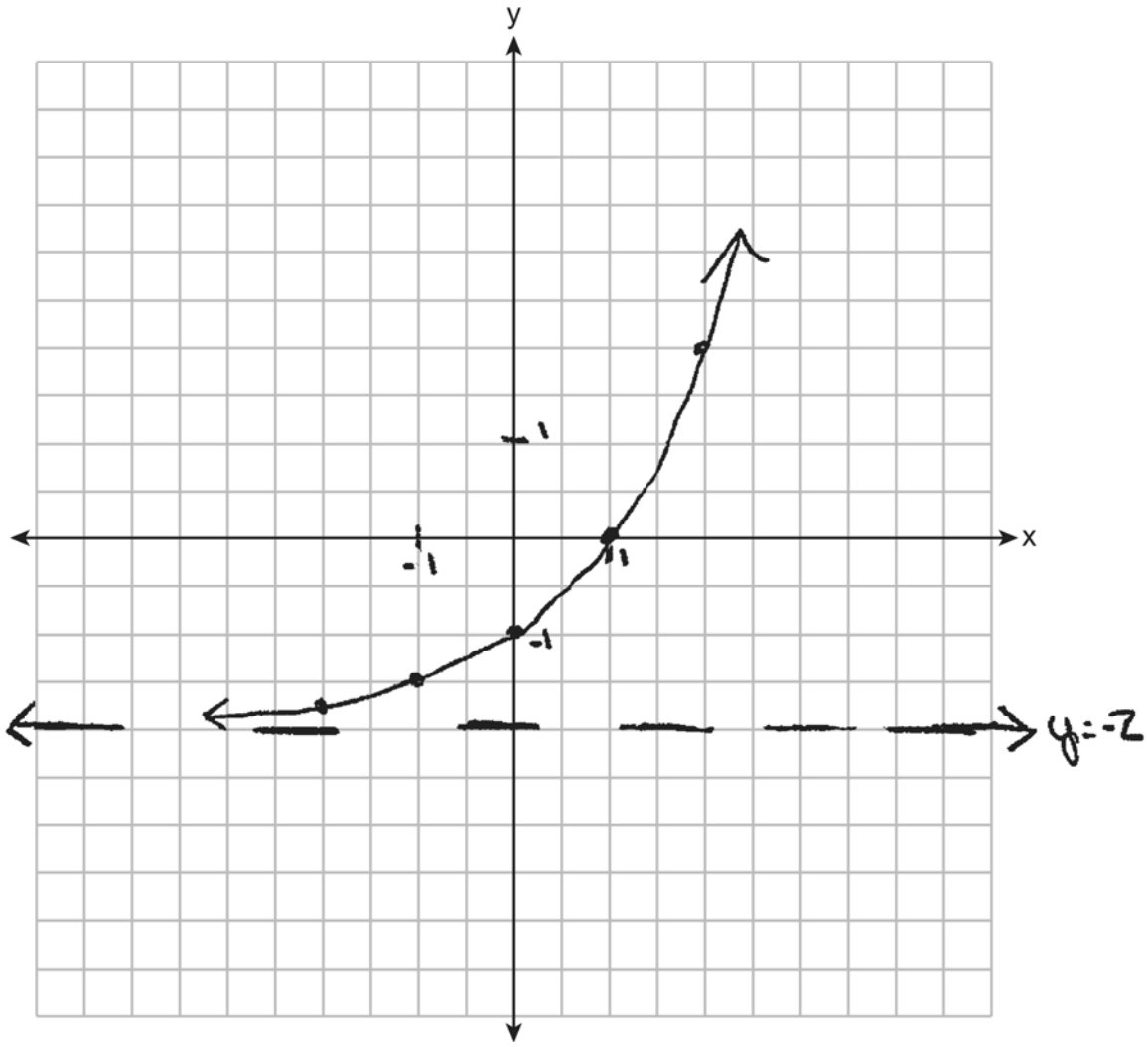
Justify your answer.

$(-64)^{2/3} = 2\sqrt{64} = 16$

Score 0: The student made multiple errors.

Question 28

28 Graph $y = 2^x - 2$ on the axes below.



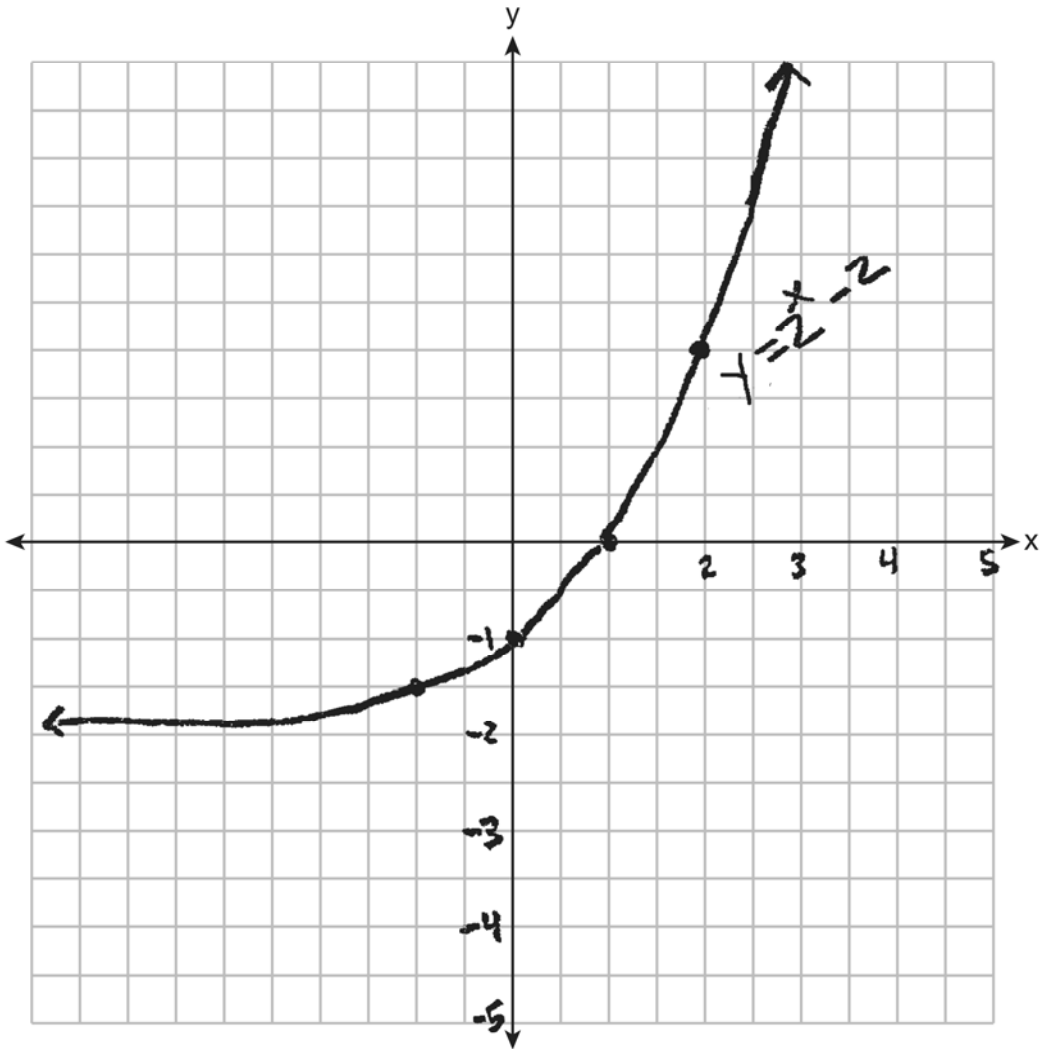
State the equation of the asymptote.

y=-2 is the asymptote

Score 2: The student gave a complete and correct response.

Question 28

28 Graph $y = 2^x - 2$ on the axes below.



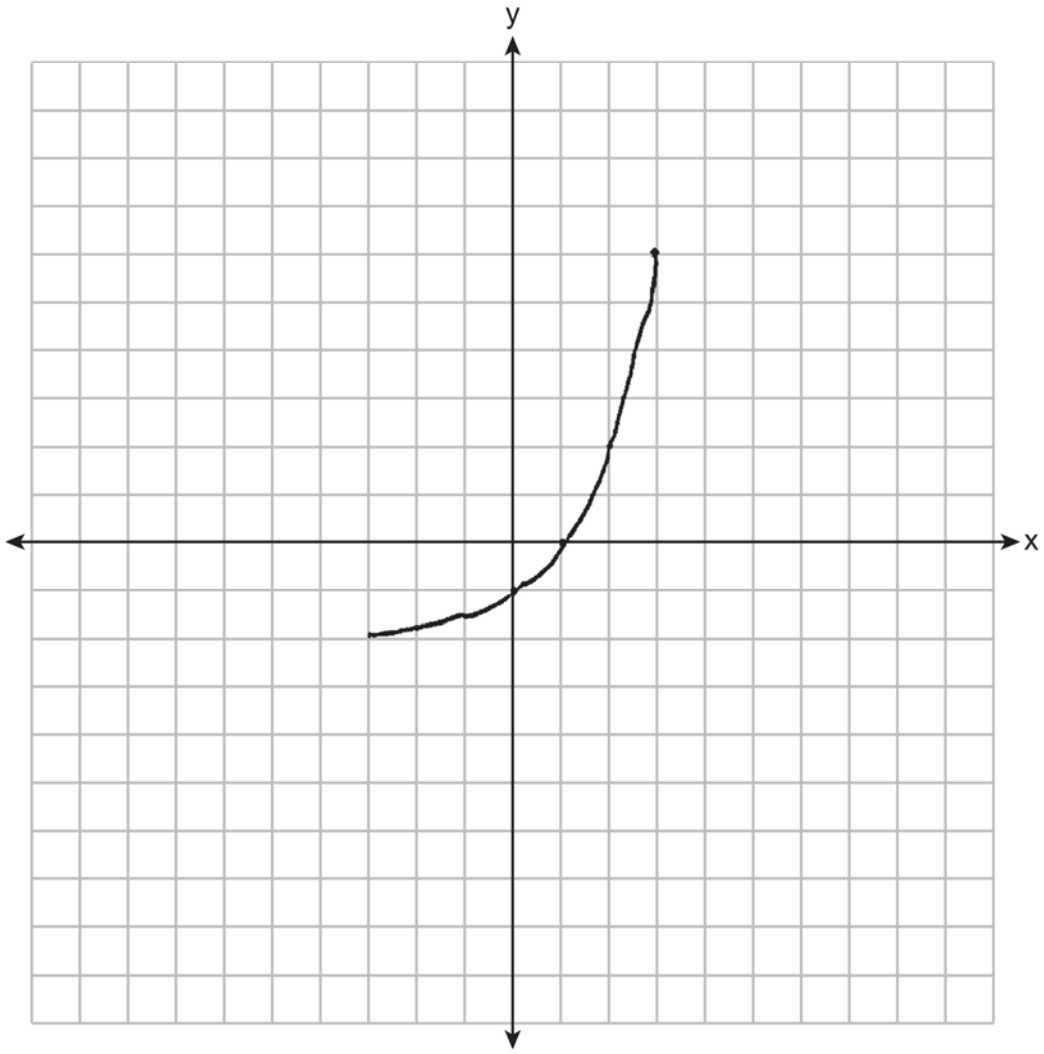
State the equation of the asymptote.

Asymptote: y = -2

Score 2: The student gave a complete and correct response.

Question 28

28 Graph $y = 2^x - 2$ on the axes below.



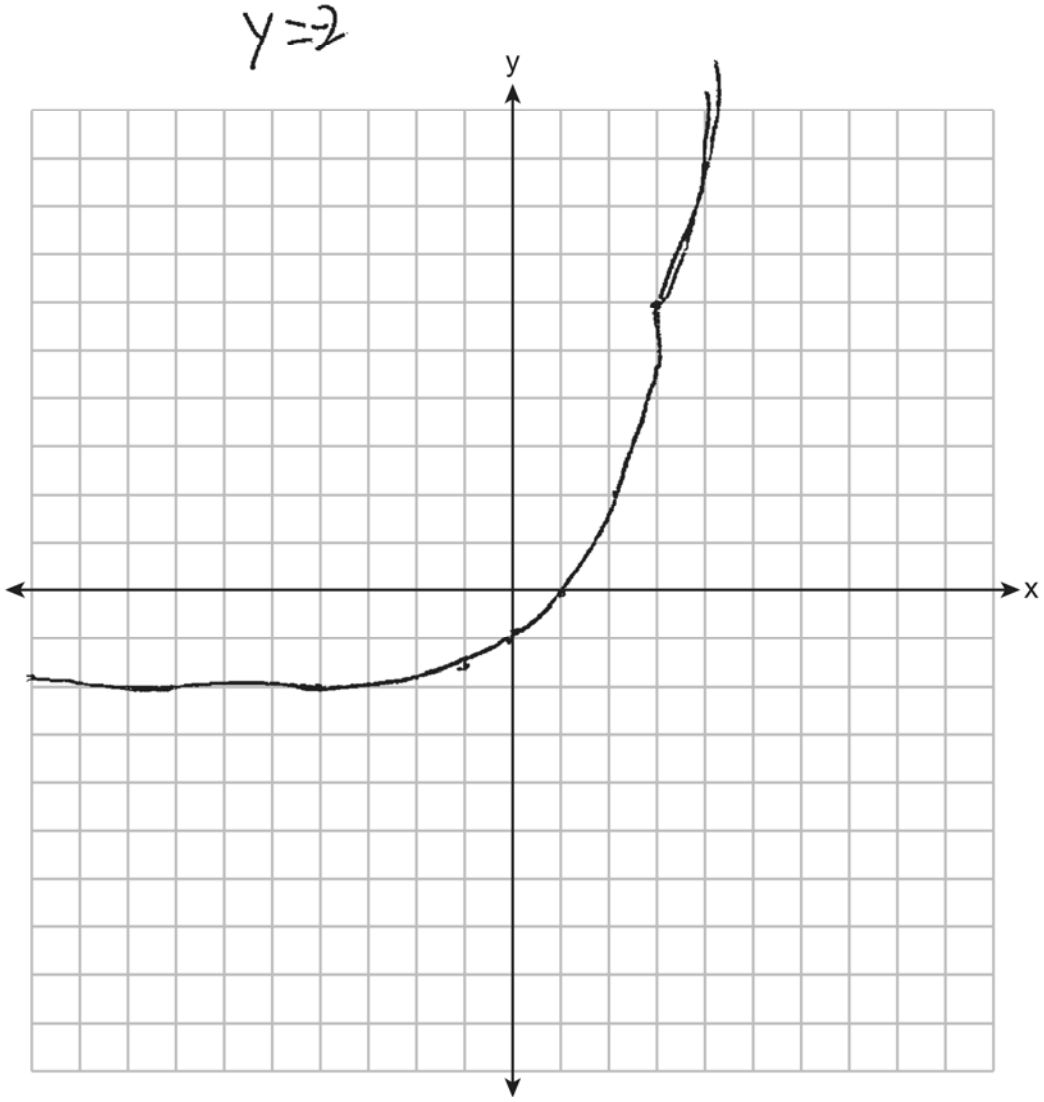
State the equation of the asymptote.

asymptote: y=-2

Score 1: The student did not include arrows or use the full extent of the grid.

Question 28

28 Graph $y = 2^x - 2$ on the axes below.

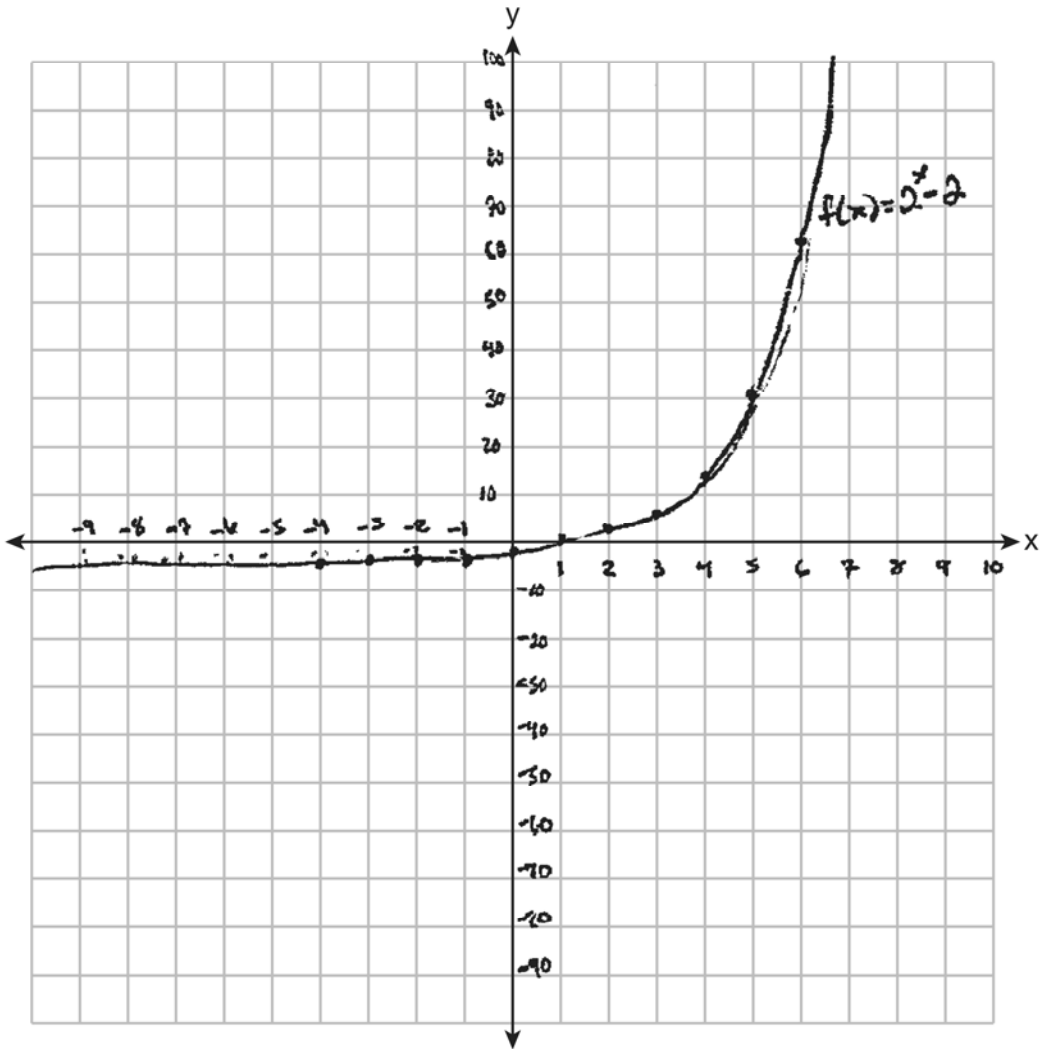


State the equation of the asymptote.

Score 1: The student correctly stated the equation of the asymptote.

Question 28

28 Graph $y = 2^x - 2$ on the axes below.

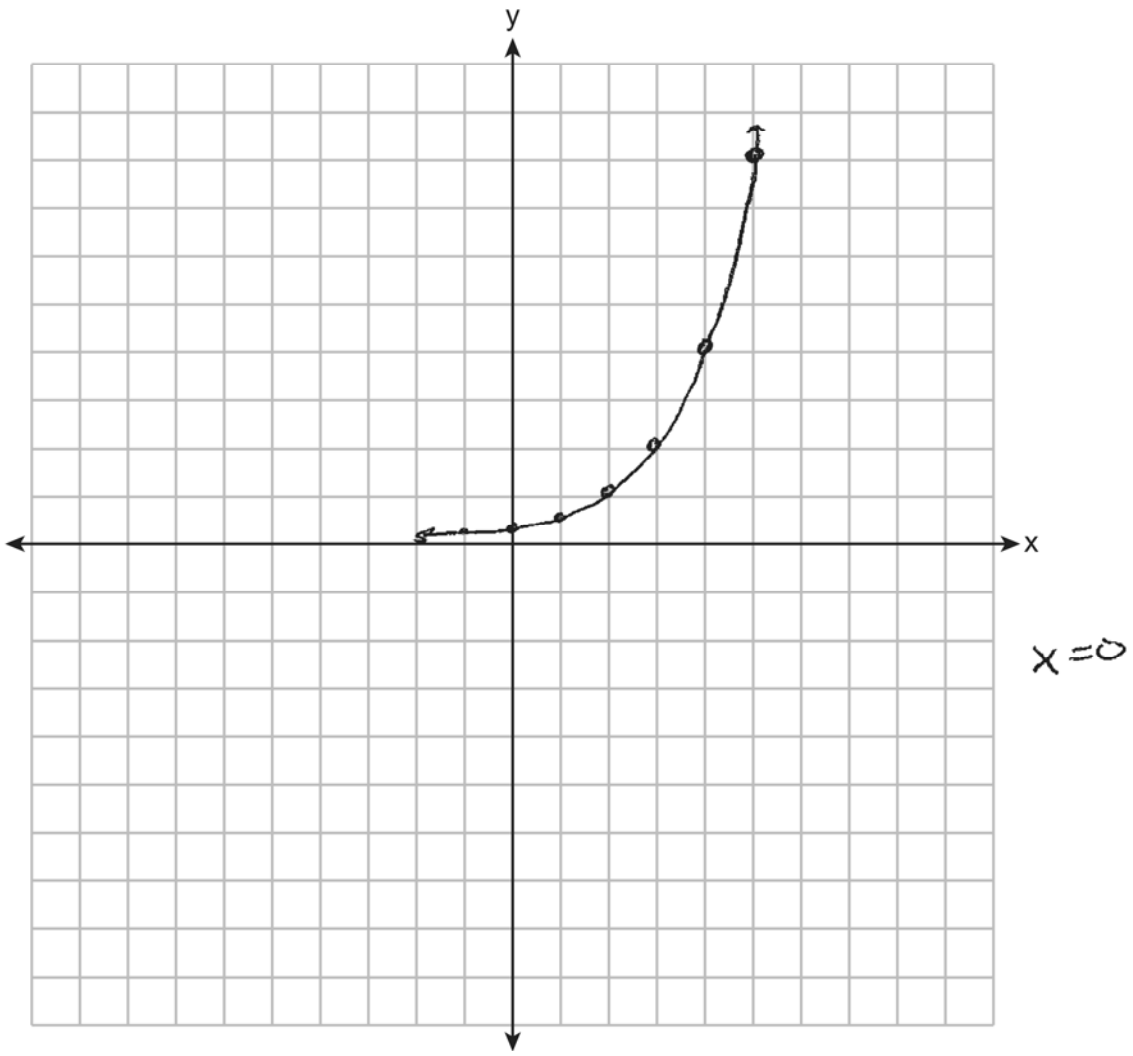


State the equation of the asymptote.

Score 0: The student made a graphing error by graphing below the asymptote and did not state the equation for the asymptote.

Question 28

28 Graph $y = 2^x - 2$ on the axes below.



State the equation of the asymptote.

Score 0: The student drew an incorrect graph and stated an incorrect equation for the asymptote.

Question 29

29 In a survey of students at a large high school, 58% speak English fluently, 24% speak Mandarin fluently, and 16% speak English and Mandarin fluently. Determine the percentage of students at the school who speak English or Mandarin fluently.

A 58%. speak english

B 24%. speak mandarin

16%. speak english & mandarin

$P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$P(A \cup B) = (.58) + (.24) - (.16)$

$P(A \cup B) = .66$

66%. speak english or mandarin

Score 2: The student gave a complete and correct response.

Question 29

29 In a survey of students at a large high school, 58% speak English fluently, 24% speak Mandarin fluently, and 16% speak English and Mandarin fluently. Determine the percentage of students at the school who speak English or Mandarin fluently.

	Speak English	Not English	Total
Speak M	16	8	24
Don't speak M	42	34	76
Total	58	42	100

100 - 34 = 66

(58 + 24) - 16 = 66

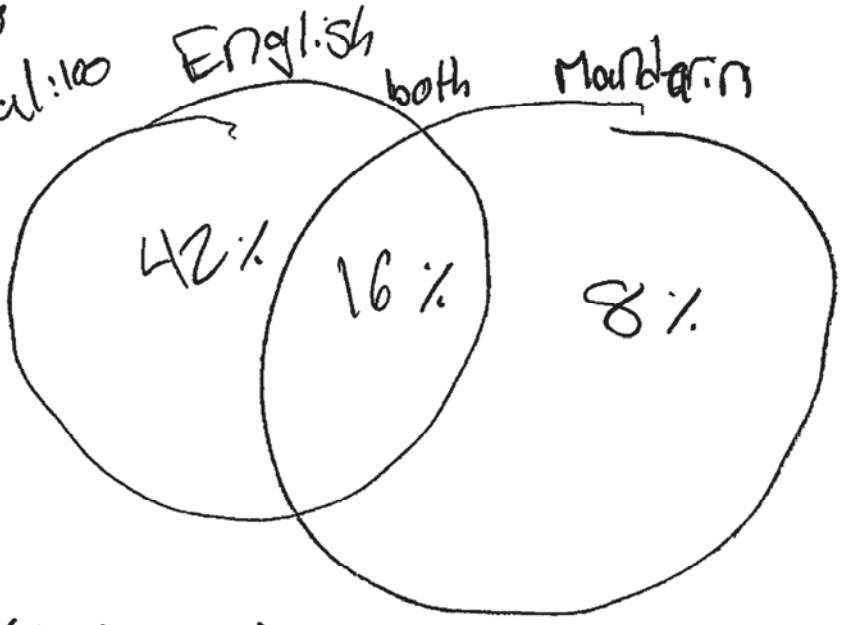
66% of the Students at School Speak English or Mandarin fluently

Score 2: The student gave a complete and correct response.

Question 29

29 In a survey of students at a large high school, 58% speak English fluently, 24% speak Mandarin fluently, and 16% speak English and Mandarin fluently. Determine the percentage of students at the school who speak English or Mandarin fluently.

58-16=42
24-16=8
total:100



$P(A \cup B) = P(A) + P(B) - P(A \cap B)$
$P(A \cup B) = 42 + 8 - 16$
$P(A \cup B) = 50 - 16$
$P(A \cup B) = 34$

Score 1: The student made a conceptual error.

Question 29

29 In a survey of students at a large high school, 58% speak English fluently, 24% speak Mandarin fluently, and 16% speak English and Mandarin fluently. Determine the percentage of students at the school who speak English or Mandarin fluently.

English = $\frac{.58}{1}$

Mandarin = $\frac{.24}{1}$

Both = $\frac{.16}{1}$

$.82 - .16$

$\frac{.66}{1}$

Score 1: The student did not write the answer as a percentage.

Question 29

29 In a survey of students at a large high school, 58% speak English fluently, 24% speak Mandarin fluently, and 16% speak English and Mandarin fluently. Determine the percentage of students at the school who speak English or Mandarin fluently.

58% → English
24% → Mandarin
16% → English + Mando

58 + 16 + 24 = 98
+2 ← % that

16 ÷ 2 = 8

8% of the students at school speak english/mandarin fluently

Score 0: The student did not show enough correct work to receive any credit.

Question 29

29 In a survey of students at a large high school, 58% speak English fluently, 24% speak Mandarin fluently, and 16% speak English and Mandarin fluently. Determine the percentage of students at the school who speak English or Mandarin fluently.

58% english
24% Mandarin
16% E+M
English or Mandarin fluently?

16:2 = 8%

58+8=66% english

24+8=32% mandarin

Score 0: The student did not show enough correct work to receive any credit.

Question 30

30 The following table represents the number of years after 1980, x, and the median value of a home in the United States in thousands of dollars, y.

x	1	10	20	30	40
y	59.07	97.02	131.6	180.7	269.2

Based on these data, write an exponential regression equation to model the median home value, in thousands of dollars, x years after 1980. Round all coefficients to the *nearest hundredth*.

ExpReg in calc

$a = 61.14$

$b = 1.04$

$y = 61.14(1.04)^x$

Score 2: The student gave a complete and correct response.

Question 30

30 The following table represents the number of years after 1980, x, and the median value of a home in the United States in thousands of dollars, y.

x	1	10	20	30	40
y	59.07	97.02	131.6	180.7	269.2

Based on these data, write an exponential regression equation to model the median home value, in thousands of dollars, x years after 1980. Round all coefficients to the *nearest hundredth*.

$y = 61.14(1.04)^x$

Score 2: The student gave a complete and correct response.

Question 30

30 The following table represents the number of years after 1980, x, and the median value of a home in the United States in thousands of dollars, y.

x	1	10	20	30	40
y	59.07	97.02	131.6	180.7	269.2

Based on these data, write an exponential regression equation to model the median home value, in thousands of dollars, x years after 1980. Round all coefficients to the *nearest hundredth*.

$61.14 \cdot 1.04^x$

Score 1: The student did not write an equation.

Question 30

30 The following table represents the number of years after 1980, x, and the median value of a home in the United States in thousands of dollars, y.

x	1	10	20	30	40
y	59.07	97.02	131.6	180.7	269.2

Based on these data, write an exponential regression equation to model the median home value, in thousands of dollars, x years after 1980. Round all coefficients to the *nearest hundredth*.

$y = (61.14 \cdot 1.04)^x$

Score 1: The student misplaced parentheses.

Question 30

30 The following table represents the number of years after 1980, x, and the median value of a home in the United States in thousands of dollars, y.

x	1	10	20	30	40
y	59.07	97.02	131.6	180.7	269.2

Based on these data, write an exponential regression equation to model the median home value, in thousands of dollars, x years after 1980. Round all coefficients to the *nearest hundredth*.

$y = 5.15x + 43.43$

Score 1: The student wrote a linear regression.

Question 30

30 The following table represents the number of years after 1980, x, and the median value of a home in the United States in thousands of dollars, y.

x	1	10	20	30	40
y	59.07	97.02	131.6	180.7	269.2

Based on these data, write an exponential regression equation to model the median home value, in thousands of dollars, x years after 1980. Round all coefficients to the *nearest hundredth*.

$A = P(1 - \%)^t$

$A = 5{,}907\,(1 - .00)^x$

Score 0: The student did not satisfy the criteria for one or more credits.

Question 31

31 Solve algebraically for all values of x that satisfy the equation below.

$$\frac{24}{x^2 + 4x} + \frac{x}{x + 4} = \frac{5}{x}$$

$\frac{24}{x^2+4x} + \frac{x^2}{x^2+4x} = \frac{5x+20}{x^2+4x}$ $x(x+4)$ ✓

$x \neq 0$

$x \neq -4$

~~$x \neq 2$~~

$24 + x^2 = 5x + 20$

$x^2 = 5x - 4$

$x^2 - 5x + 4 = 0$

$(x-4)(x-1)$

$x = 4$

$x = 1$

When $x = 4$ and $x = 1$ the equation is satisfied

Score 2: The student gave a complete and correct response.

Question 31

31 Solve algebraically for all values of x that satisfy the equation below.

$$\frac{24}{x^2 + 4x} + \frac{x(x)}{x(x + 4)} = \frac{5(x+4)}{(x)(x+4)}$$

$24 + x^2 = 5x + 20$
$-20 \quad -20$

$4 + x^2 = 5x$
$-5x \quad -5x$

$x^2 - 5x + 4 = 0$

$(x - 4)(x - 1)$

$x - 4 = 0$ $\quad x - 1 = 0$
$+4 \quad +4$ $\quad +1 \quad +1$
$x = 4$ $\quad x = 1$

$x = 4$
$x = 1$

Score 2: The student gave a complete and correct response.

Question 31

31 Solve algebraically for all values of x that satisfy the equation below.

$$\frac{24}{x^2+4x}+\frac{x}{x+4}=\frac{5}{x}$$

$\frac{24}{x^2+4x} + \frac{x^2}{x^2+4x} = \frac{5}{x}$

$\frac{24+x^2}{x^2+4x} = \frac{5}{x}$

$24x + x^3 = 5x^2 + 20x$

$x^3 + 4x - 5x^2 = 0$

$x^3 - 5x^2 + 4x = 0$

$x(x^2 - 5x + 4) = 0$

$x(x-1)(x-4)$

0, 1, 4

Score 1: The student did not reject an extraneous root.

Question 31

31 Solve algebraically for all values of x that satisfy the equation below.

$$\frac{24}{x^2 + 4x} + \frac{x}{x + 4} = \frac{5}{x}$$

$\frac{24}{x^2+4x} + \frac{x^2}{x^2+4x} = \frac{5x+20}{x^2+4x}$

$24 + x^2 = 5x + 20$

$x^2 - 5x + 4 = 0$

$\frac{-(-5) \pm \sqrt{(-5)^2 - 4(4)}}{2}$

$x = \{6.5, 3.5\}$

$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Score 1: The student wrote a correct quadratic equation in standard form.

Question 31

31 Solve algebraically for all values of x that satisfy the equation below.

$$\frac{24}{x^2+4x}+\frac{x}{x+4}=\frac{5}{x}$$

(x) $(x+4)$

$\frac{24}{x^2+4x}+\frac{x^2}{x^2+4x}=\frac{5x+20}{x^2+4x}$

$x^2+5x+4=0$

4 | 4, 1 / 5

$x^2+x+4x+4=0$

$x(x+1)+4(x+1)$

$(x+4)(x+1)=0$

$x=-4$

$x=-1$

$x+4=0$	$x+1=0$
$-4\ -4$	$-1\ -1$
$x=-4$	$x=-1$

Score 0: The student made a transcription error and did not check for extraneous solutions.

Question 31

31 Solve algebraically for all values of x that satisfy the equation below.

$$\left(\frac{24}{x^2+4x}+\frac{x}{x+4}\right)\left(\frac{5}{x}\right)$$

$(x+4+2x)$

$\sqrt{x^2+4x}$

$x+2x$

$24(x+4)+x(x+2x)=5(x+4+2x)$

$24x+96+x^2+2x^2=5x+20+10x$

$-5x \quad -20-10x \qquad -5x \quad -20-10x$

$9x+76+3x^2=0$

$3x^2+9x+76=0$

$\frac{-b\pm\sqrt{b^2-4ac}}{2a}$ $\qquad \frac{-9\pm\sqrt{9^2-4(3)(76)}}{2(3)}$

$\frac{-9\pm\sqrt{-831i}}{6}$ $\qquad \frac{-9+\sqrt{-831i}}{6}$ $\qquad \frac{-9-\sqrt{-831i}}{6}$

Score 0: The student made multiple errors.

Question 32

32 Express $i(x + i) - (x - i)^2$ in simplest $a + bi$ form.

$xi + i^2 - 1$

$(x-i)(x-i)$

$x^2 - xi - xi + i^2$

$-2xi$

$xi + i^2 - x^2 + 2xi - i^2$

$3xi$

$-x^2 + 3xi$

Score 2: The student gave a complete and correct response.

Question 32

32 Express $i(x + i) - (x - i)^2$ in simplest $a + bi$ form.

$-(x-i)(xi)$

$ix + i^2 - x^2 + ix + ix - i^2$

$3xi - x^2$

Score 2: The student gave a complete and correct response.

Question 32

32 Express $i(x + i) - (x - i)^2$ in simplest $a + bi$ form.

$xi - 1 - x^2 + 2xi + 1$

$-x^2 + 3x$

$-x(x - 3)$

Score 1: The student did not write their final answer in $a + bi$ form.

Question 32

32 Express $i(x + i) - (x - i)^2$ in simplest $a + bi$ form.

$ix + i^2 - x^2 - 2xi + i^2$

$ix - 1 - x^2 - 2xi - 1$

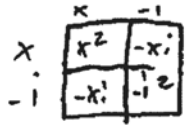
$-x^2 - 2 - 1xi$

Score 1: The student did not distribute the negative sign.

Question 32

32 Express $i(x + i) - (x - i)^2$ in simplest $a + bi$ form.

$xi - 1 \cdot -$



$x^2 + x1 - xi + 1$

$x^2 - 2xi + 1$

$xi - 1 - x^2 - 2xi + 1$

$x^2 - x1$

Score 0: The student made multiple errors.

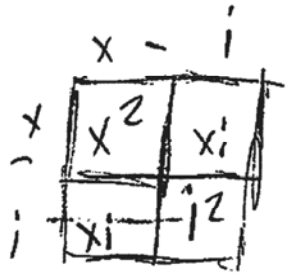
Question 32

32 Express $i(x + i) - (x - i)^2$ in simplest $a + bi$ form.

$ix + i^2 - x^2 + xi^2 + -1$

$ix + \cancel{+1} \cancel{-1} - x^2 + xi^2 + \cancel{+1} \cancel{-1}$

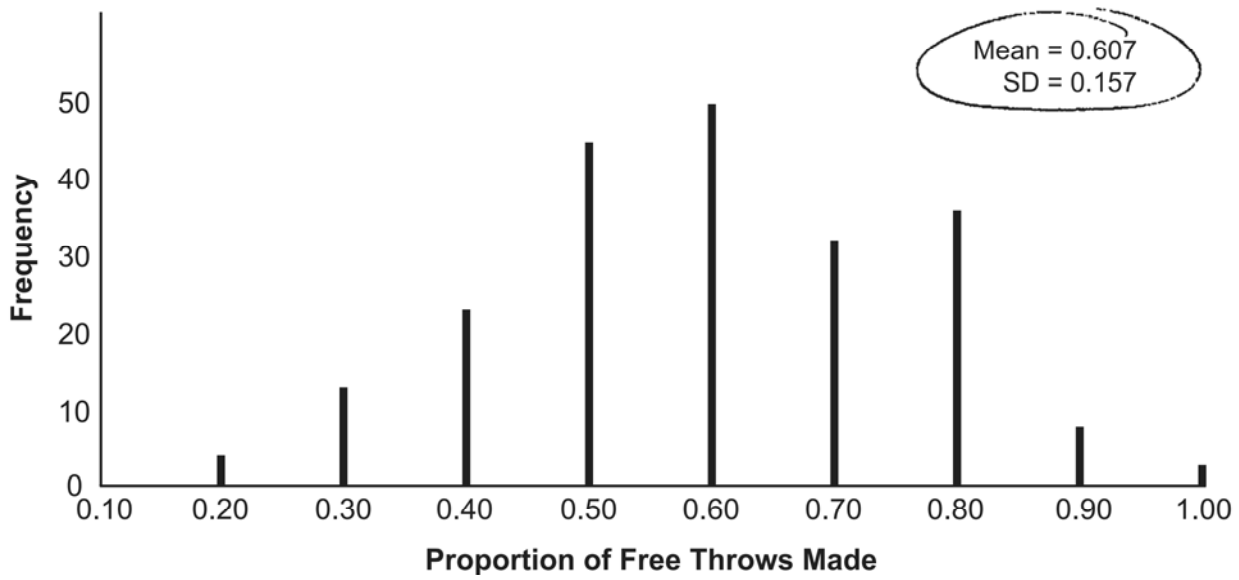
$ix - x^2 + xi^2$



Score 0: The student made multiple errors.

Question 33

33 On a high school basketball team, Alex typically makes 60% of his free throws. In the last four minutes of the game, Alex took 10 free throws and made 30% of them. Fans were saying he missed on purpose. A simulation was run of sample size 10, simulated 200 times, based on the premise that 60% of the free throws were made. The approximately normal results are shown below.



Based on the simulation, determine an interval containing the middle 95% of simulated values. State your answer to three decimal places.

$0.607 \pm 2(0.157)$

$(0.293, 0.921)$

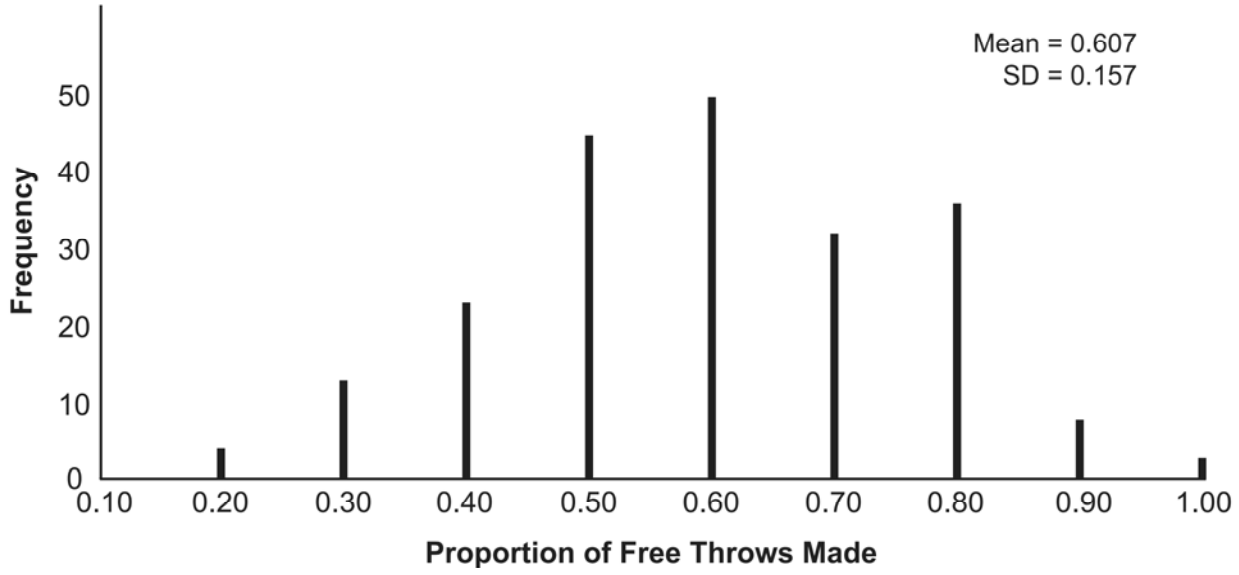
Do the fans have a valid argument? Explain using statistical evidence.

The fans do not have a valid argument because making 3/10 free throws (.3) falls within the confidence interval for this simulation so it is not unusual.

Score 4: The student gave a complete and correct response.

Question 33

33 On a high school basketball team, Alex typically makes 60% of his free throws. In the last four minutes of the game, Alex took 10 free throws and made 30% of them. Fans were saying he missed on purpose. A simulation was run of sample size 10, simulated 200 times, based on the premise that 60% of the free throws were made. The approximately normal results are shown below.



Based on the simulation, determine an interval containing the middle 95% of simulated values. State your answer to three decimal places.

middle 95% = mean ± M.O.E.
= .607 ± 2(.157)
(.293, .921)

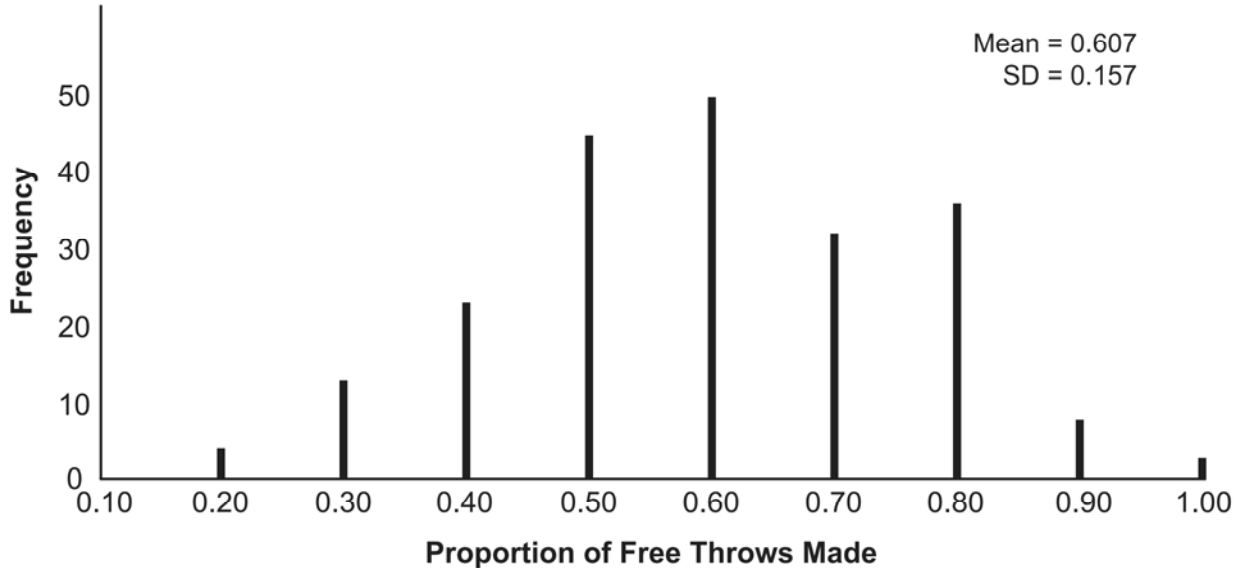
Do the fans have a valid argument? Explain using statistical evidence.

They do not have a valid argument because 30% of shots made are in the middle 95% of the data.

Score 4: The student gave a complete and correct response.

Question 33

33 On a high school basketball team, Alex typically makes 60% of his free throws. In the last four minutes of the game, Alex took 10 free throws and made 30% of them. Fans were saying he missed on purpose. A simulation was run of sample size 10, simulated 200 times, based on the premise that 60% of the free throws were made. The approximately normal results are shown below.



Based on the simulation, determine an interval containing the middle 95% of simulated values. State your answer to three decimal places.

.293 - .921

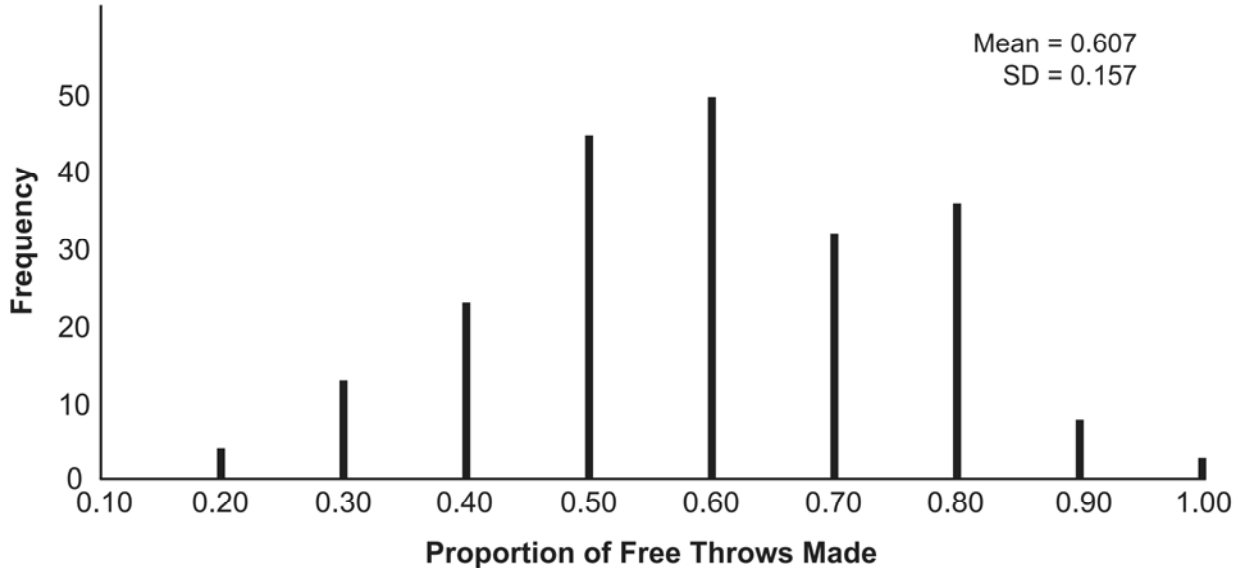
Do the fans have a valid argument? Explain using statistical evidence.

No, $\frac{3}{10}$/.3 falls inside the middle 95% so it isn't statistically significant.

Score 3: The student did not show work to obtain the interval.

Question 33

33 On a high school basketball team, Alex typically makes 60% of his free throws. In the last four minutes of the game, Alex took 10 free throws and made 30% of them. Fans were saying he missed on purpose. A simulation was run of sample size 10, simulated 200 times, based on the premise that 60% of the free throws were made. The approximately normal results are shown below.



Based on the simulation, determine an interval containing the middle 95% of simulated values. State your answer to three decimal places.

.607 ± 2(.157)
.293 to .921

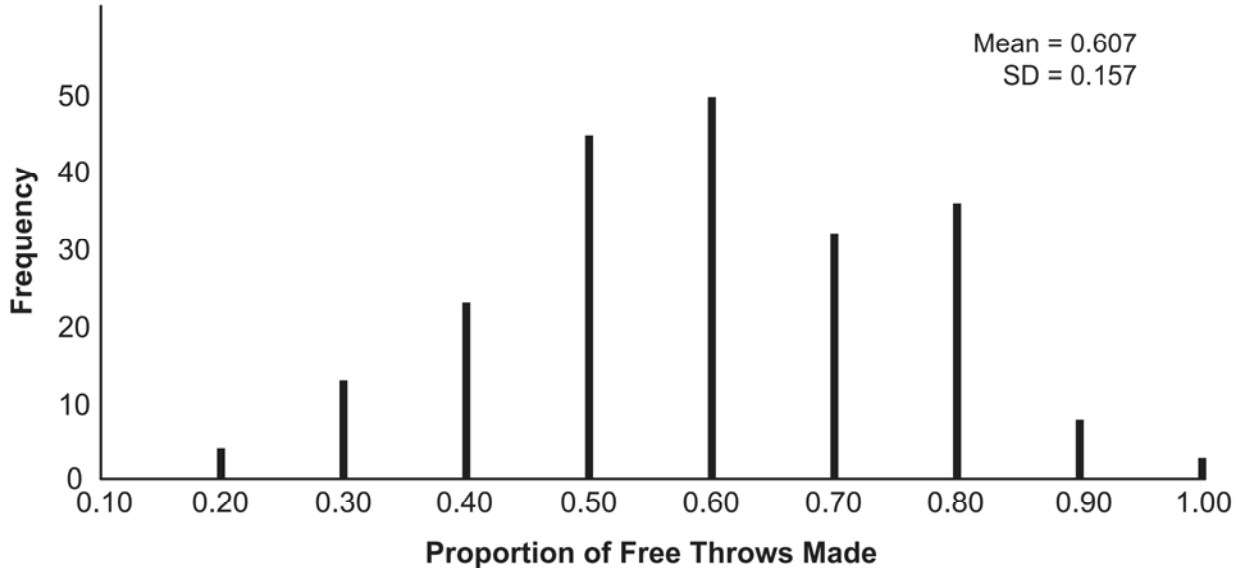
Do the fans have a valid argument? Explain using statistical evidence.

30% = .3 .3 were hit, during the last 4 minutes, .3 is not Significant, therefore the fans don't have a valid argument.

Score 3: The student gave an incomplete explanation by not referencing the interval.

Question 33

33 On a high school basketball team, Alex typically makes 60% of his free throws. In the last four minutes of the game, Alex took 10 free throws and made 30% of them. Fans were saying he missed on purpose. A simulation was run of sample size 10, simulated 200 times, based on the premise that 60% of the free throws were made. The approximately normal results are shown below.



Based on the simulation, determine an interval containing the middle 95% of simulated values. State your answer to three decimal places.

$0.607 + 2(0.157) = 0.921$

$0.607 - 2(0.157) = 0.293$

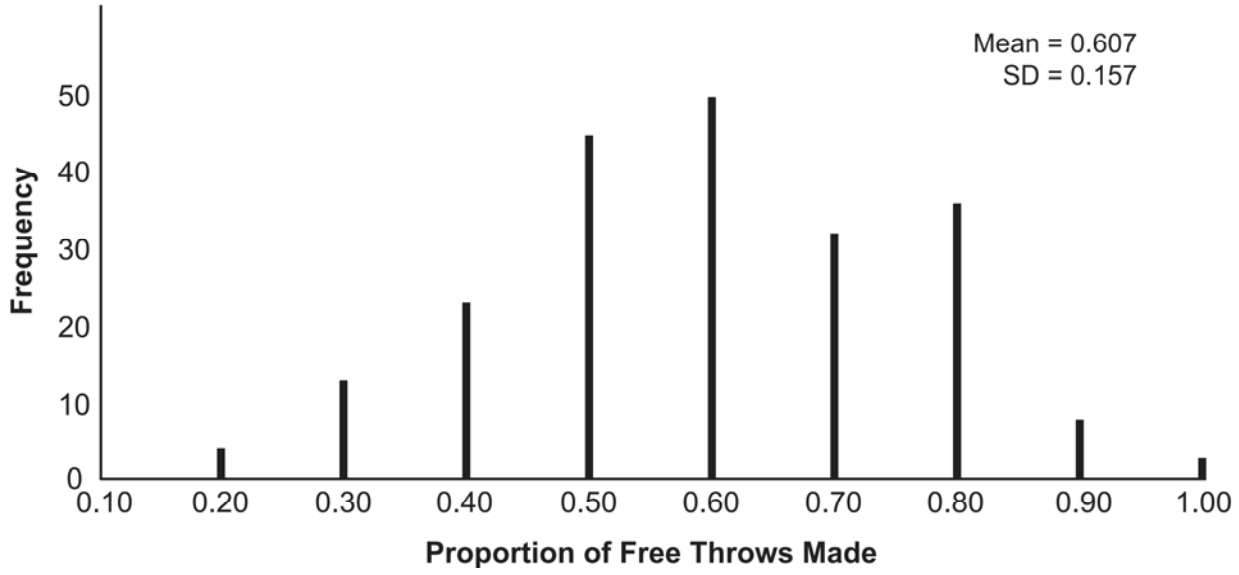
Do the fans have a valid argument? Explain using statistical evidence.

No because the data is inbetween the interval.

Score 2: The student did not write an interval and provided an incomplete explanation.

Question 33

33 On a high school basketball team, Alex typically makes 60% of his free throws. In the last four minutes of the game, Alex took 10 free throws and made 30% of them. Fans were saying he missed on purpose. A simulation was run of sample size 10, simulated 200 times, based on the premise that 60% of the free throws were made. The approximately normal results are shown below.



Based on the simulation, determine an interval containing the middle 95% of simulated values. State your answer to three decimal places.

.29 – .92

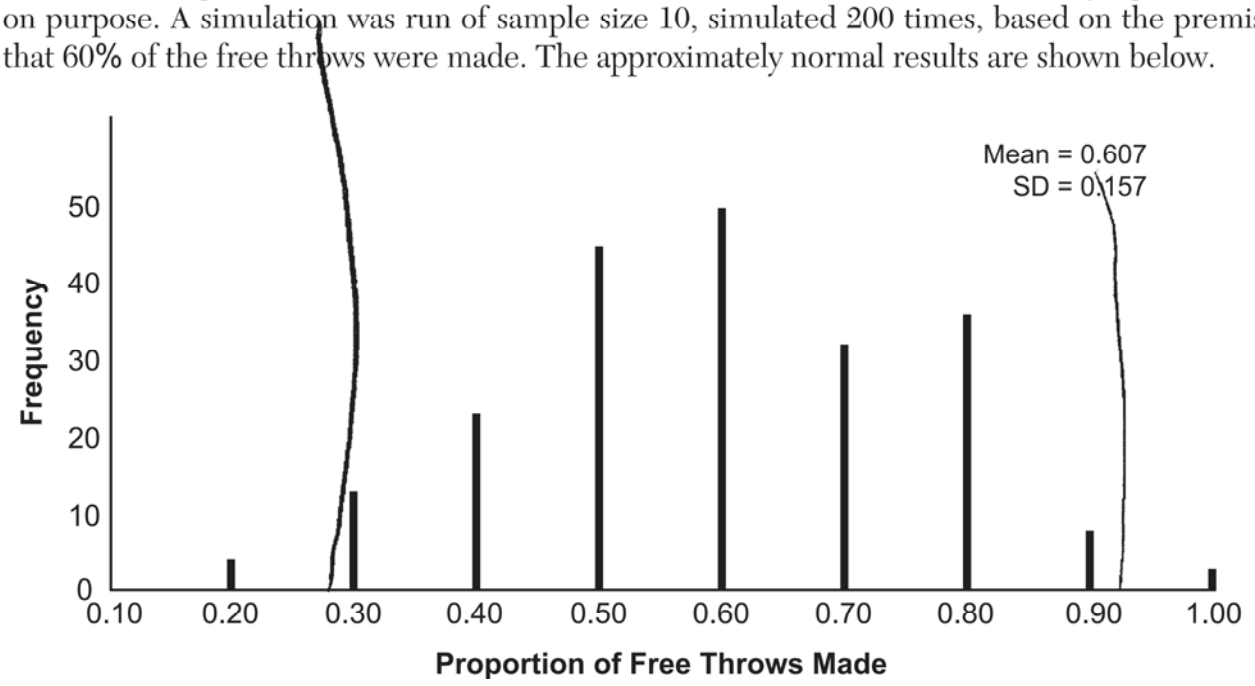
Do the fans have a valid argument? Explain using statistical evidence.

No. The results are within the 95% of expected values, (.3) the data is not significant.

Score 2: The student provided a correct explanation.

Question 33

33 On a high school basketball team, Alex typically makes 60% of his free throws. In the last four minutes of the game, Alex took 10 free throws and made 30% of them. Fans were saying he missed on purpose. A simulation was run of sample size 10, simulated 200 times, based on the premise that 60% of the free throws were made. The approximately normal results are shown below.



Based on the simulation, determine an interval containing the middle 95% of simulated values. State your answer to three decimal places.

.609 + 2(.157) = .921
.607 − 2(.157) = .293

Do the fans have a valid argument? Explain using statistical evidence.

Yes because it is unlikely that it is falling out of the 95%.

Score 1: The student did not write an interval and the explanation is incorrect.

Question 33

33 On a high school basketball team, Alex typically makes 60% of his free throws. In the last four minutes of the game, Alex took 10 free throws and made 30% of them. Fans were saying he missed on purpose. A simulation was run of sample size 10, simulated 200 times, based on the premise that 60% of the free throws were made. The approximately normal results are shown below.

Based on the simulation, determine an interval containing the middle 95% of simulated values. State your answer to three decimal places.

0.607 ± 0.157

.45 – .76

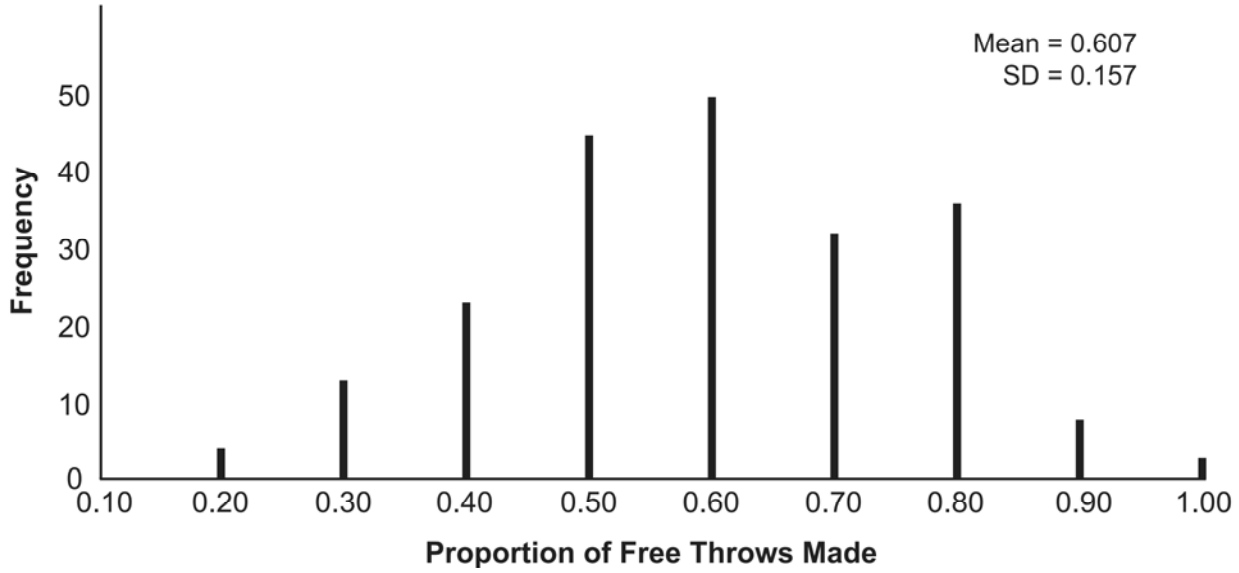
Do the fans have a valid argument? Explain using statistical evidence.

No, 60% is inside the confidence interval, meaning he made what he should've.

Score 1: The student received partial credit for the explanation.

Question 33

33 On a high school basketball team, Alex typically makes 60% of his free throws. In the last four minutes of the game, Alex took 10 free throws and made 30% of them. Fans were saying he missed on purpose. A simulation was run of sample size 10, simulated 200 times, based on the premise that 60% of the free throws were made. The approximately normal results are shown below.



Based on the simulation, determine an interval containing the middle 95% of simulated values. State your answer to three decimal places.

2,000

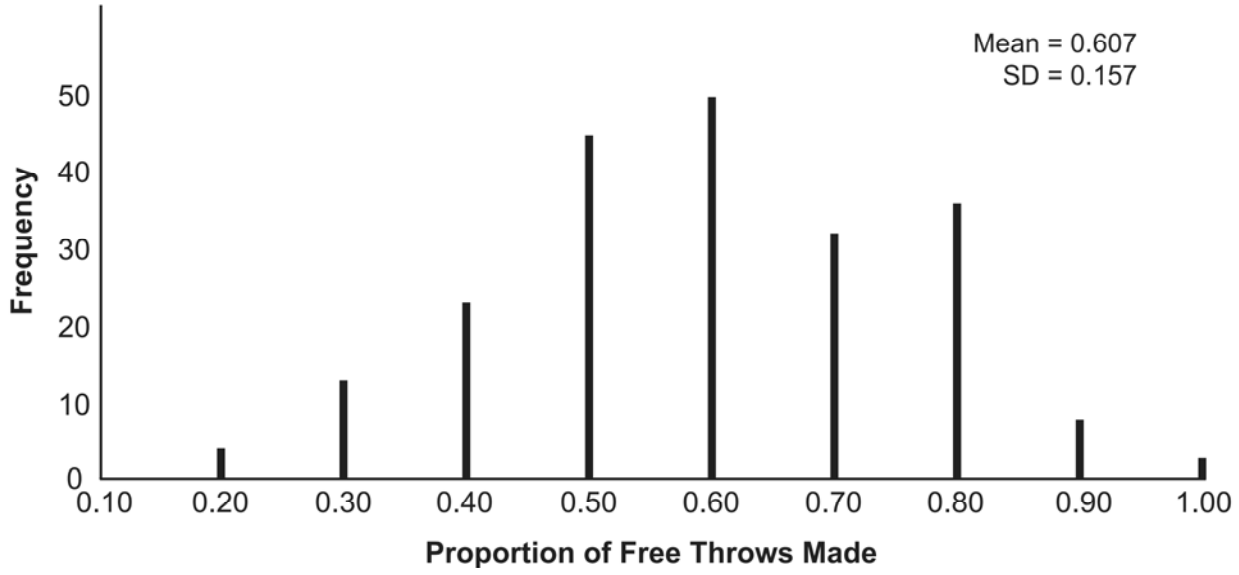
Do the fans have a valid argument? Explain using statistical evidence.

No the fans do not have a valid argument because of the evidence shown in the graph.

Score 0: The student did not satisfy the criteria for one or more credits.

Question 33

33 On a high school basketball team, Alex typically makes 60% of his free throws. In the last four minutes of the game, Alex took 10 free throws and made 30% of them. Fans were saying he missed on purpose. A simulation was run of sample size 10, simulated 200 times, based on the premise that 60% of the free throws were made. The approximately normal results are shown below.



Based on the simulation, determine an interval containing the middle 95% of simulated values. State your answer to three decimal places.

0.60 - 0.70

Do the fans have a valid argument? Explain using statistical evidence.

No since Alex's average isn't that greater than the simulation's

Score 0: The student did not satisfy the criteria for one or more credits.

Question 34

34 The breakdown of a drug is modeled by $A(t) = A_0e^{-rt}$, where $A(t)$ is the amount of the drug in the body, A_0 is the initial dosage, r is the rate of decay, and t is the time in hours. A patient is given 450 mg of a drug that has a decay rate of 0.205. Write a function, $A(t)$, to model the amount of the drug remaining in the body after t hours.

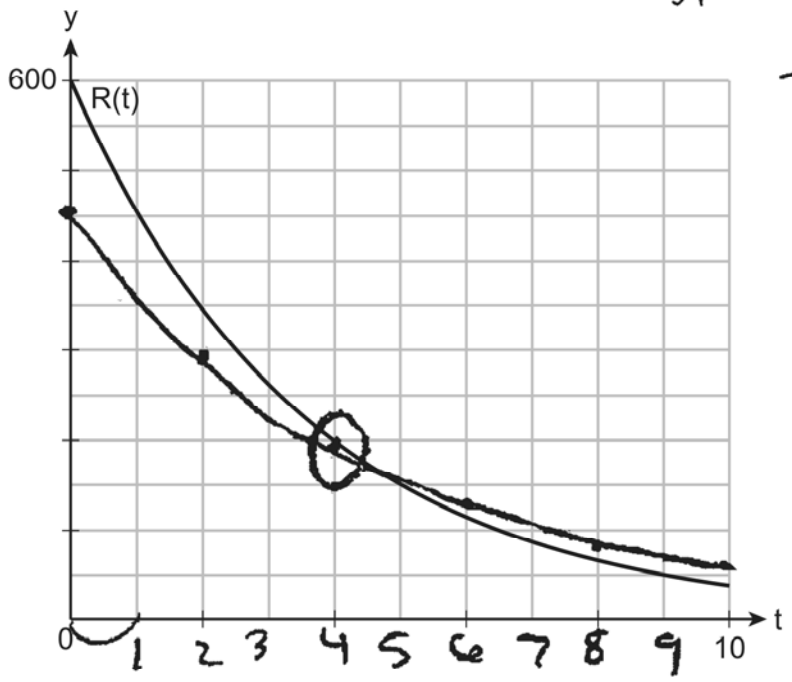
$A(t) = 450e^{-0.205t}$

The sketch below shows the function $R(t)$, which models the breakdown of a different drug administered to the same patient.

Graph $A(t)$ on the grid below.

$y_1 = 450e^{-0.205t}$

x	y
2	298.64
4	198.19
6	131.53
8	87.291
10	57.931



Using the graph, approximate to the *nearest hour* when the patient has the same amount of both drugs remaining.

4th hour

Score 4: The student gave a complete and correct response.

Question 34

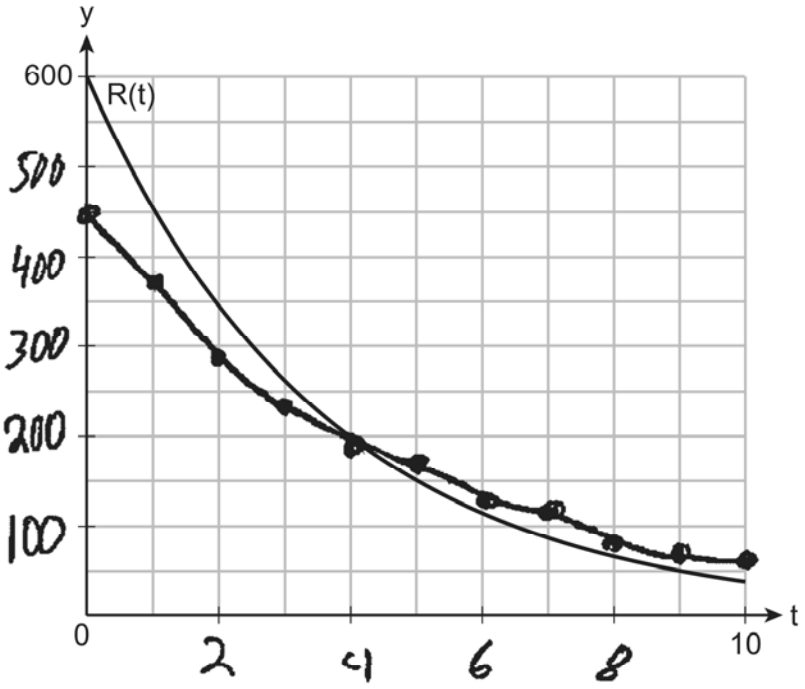
34 The breakdown of a drug is modeled by $A(t) = A_0e^{-rt}$, where $A(t)$ is the amount of the drug in the body, A_0 is the initial dosage, r is the rate of decay, and t is the time in hours. A patient is given 450 mg of a drug that has a decay rate of 0.205. Write a function, $A(t)$, to model the amount of the drug remaining in the body after t hours.

$A_0 = 450$
$r = 0.205$

$A(t) = 450e^{(-0.205)(t)}$

The sketch below shows the function $R(t)$, which models the breakdown of a different drug administered to the same patient.

Graph $A(t)$ on the grid below.



Using the graph, approximate to the *nearest hour* when the patient has the same amount of both drugs remaining.

after 4 hours

Score 4: The student gave a complete and correct response.

Question 34

34 The breakdown of a drug is modeled by $A(t) = A_0e^{-rt}$, where $A(t)$ is the amount of the drug in the body, A_0 is the initial dosage, r is the rate of decay, and t is the time in hours. A patient is given 450 mg of a drug that has a decay rate of 0.205. Write a function, $A(t)$, to model the amount of the drug remaining in the body after t hours.

$A(t) = A_0e^{-rt}$

$A(t)$ = amount of drug in body

A_0 = initial dosage

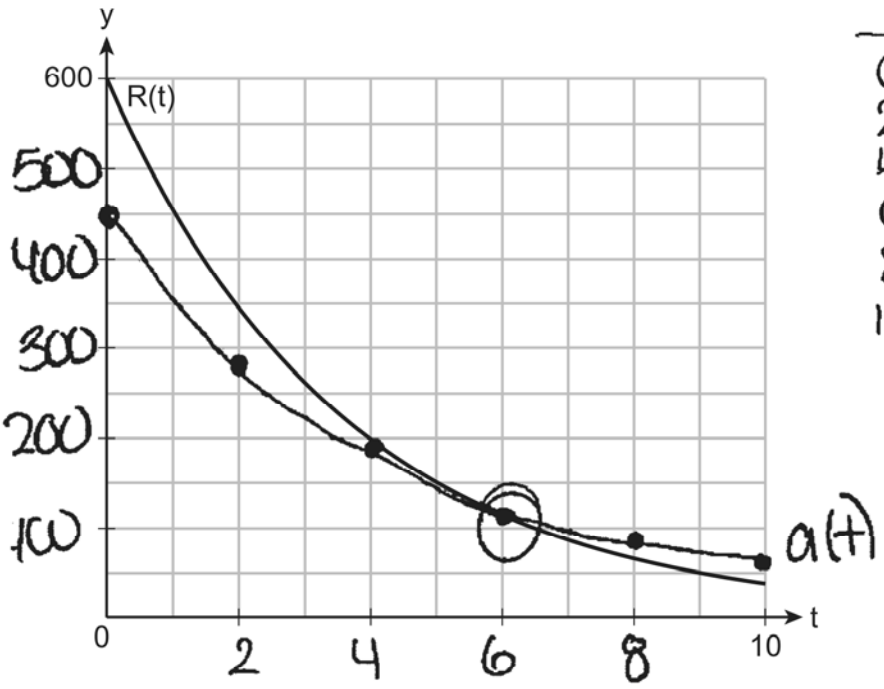
r = rate of decay

t = time (hours)

$A(t) = 450e^{-0.205t}$

The sketch below shows the function $R(t)$, which models the breakdown of a different drug administered to the same patient.

Graph $A(t)$ on the grid below.



t	a(t)
0	450
2	298.6
4	198.2
6	131.5
8	87.3
10	57.9

Using the graph, approximate to the *nearest hour* when the patient has the same amount of both drugs remaining.

16 hours

Score 3: The student made one graphing error.

Question 34

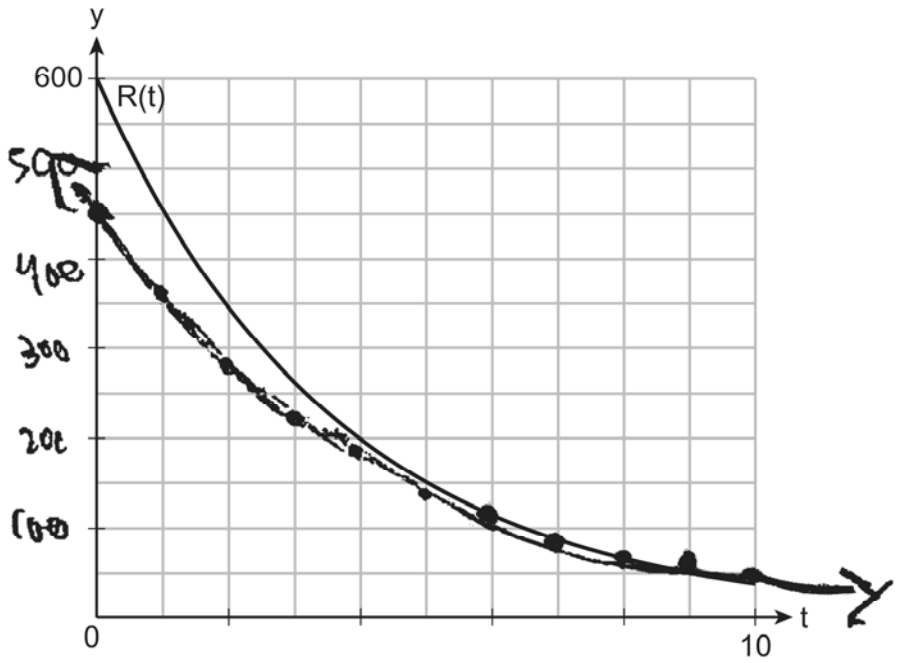
34 The breakdown of a drug is modeled by $A(t) = A_0e^{-rt}$, where $A(t)$ is the amount of the drug in the body, A_0 is the initial dosage, r is the rate of decay, and t is the time in hours. A patient is given 450 mg of a drug that has a decay rate of 0.205. Write a function, $A(t)$, to model the amount of the drug remaining in the body after t hours.

$A(t) = 450(1 - 0.205)^t$

$A(t) = 450(0.795)^t$

The sketch below shows the function $R(t)$, which models the breakdown of a different drug administered to the same patient.

Graph $A(t)$ on the grid below.



Using the graph, approximate to the *nearest hour* when the patient has the same amount of both drugs remaining.

I'd say 7th hour

Score 3: The student wrote an incorrect exponential equation.

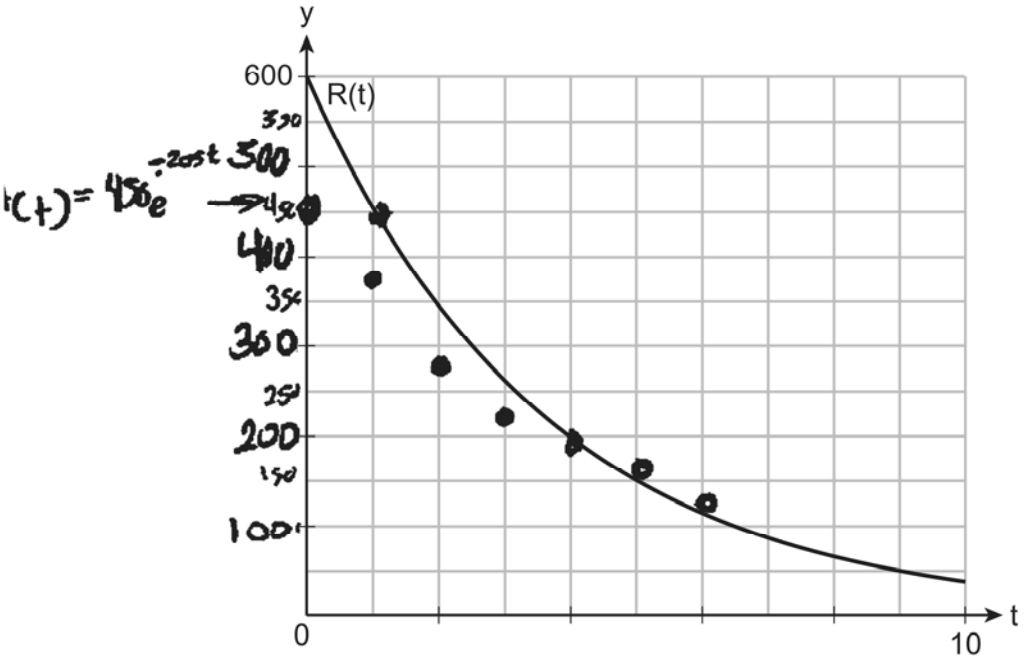
Question 34

34 The breakdown of a drug is modeled by $A(t) = A_0e^{-rt}$, where $A(t)$ is the amount of the drug in the body, A_0 is the initial dosage, r is the rate of decay, and t is the time in hours. A patient is given 450 mg of a drug that has a decay rate of 0.205. Write a function, $A(t)$, to model the amount of the drug remaining in the body after t hours.

$A(t) = 450e^{-0.205t}$

The sketch below shows the function $R(t)$, which models the breakdown of a different drug administered to the same patient.

Graph $A(t)$ on the grid below.



Using the graph, approximate to the *nearest hour* when the patient has the same amount of both drugs remaining.

on approximately around the 4th hour, the patient had the same amount of drugs remaining.

Score 2: The student made multiple graphing errors.

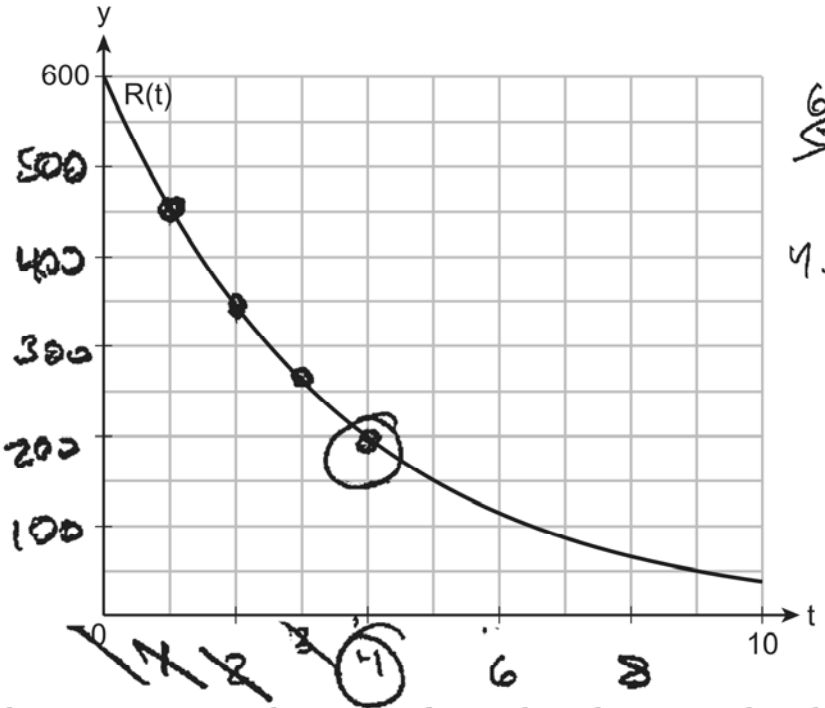
Question 34

34 The breakdown of a drug is modeled by $A(t) = A_0e^{-rt}$, where $A(t)$ is the amount of the drug in the body, A_0 is the initial dosage, r is the rate of decay, and t is the time in hours. A patient is given 450 mg of a drug that has a decay rate of 0.205. Write a function, $A(t)$, to model the amount of the drug remaining in the body after t hours.

$A(t) = 450e^{-.205t}$

The sketch below shows the function $R(t)$, which models the breakdown of a different drug administered to the same patient.

Graph $A(t)$ on the grid below.



600 − 150

450 every hour

Using the graph, approximate to the *nearest hour* when the patient has the same amount of both drugs remaining.

$y' = 450e^{-.205t}$

At hour 4 they have the same amount of drug in their body.

X	Y1
0	450
1	366.59
2	298.64
3	243.29
4	198.14

Score 2: The student did not graph $A(t)$.

Question 34

34 The breakdown of a drug is modeled by $A(t) = A_0e^{-rt}$, where $A(t)$ is the amount of the drug in the body, A_0 is the initial dosage, r is the rate of decay, and t is the time in hours. A patient is given 450 mg of a drug that has a decay rate of 0.205. Write a function, $A(t)$, to model the amount of the drug remaining in the body after t hours.

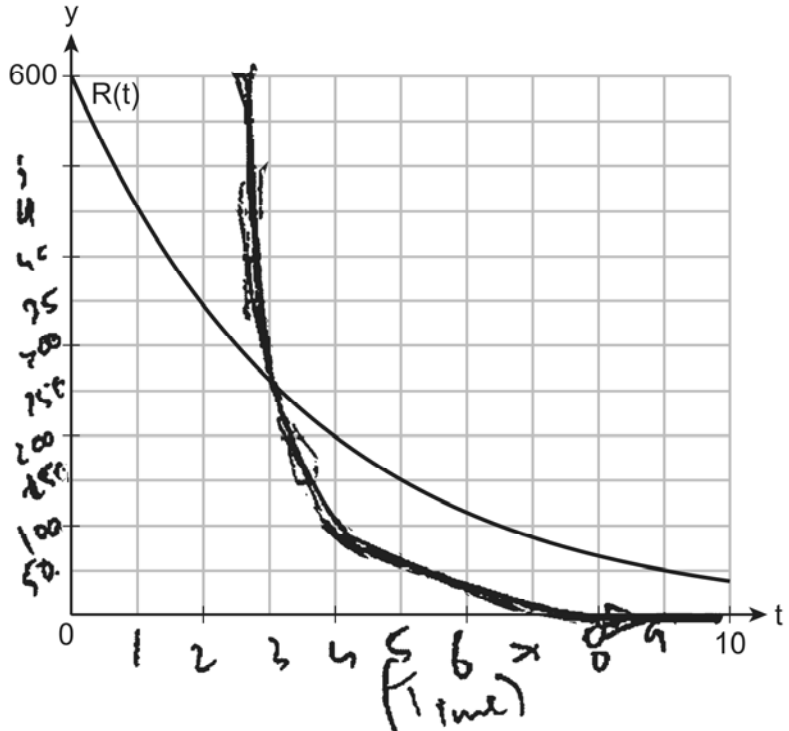
$A(t) = 450e^{-(0.9795)t}$

$At = 188.95 + 1160t$

Amount of drug remaining in the body after t hours is $460e^{-(0.9795)t}$

The sketch below shows the function $R(t)$, which models the breakdown of a different drug administered to the same patient.

Graph $A(t)$ on the grid below.



Using the graph, approximate to the *nearest hour* when the patient has the same amount of both drugs remaining.

Approximately 3 hours

Score 1: The student earned full credit on the last part.

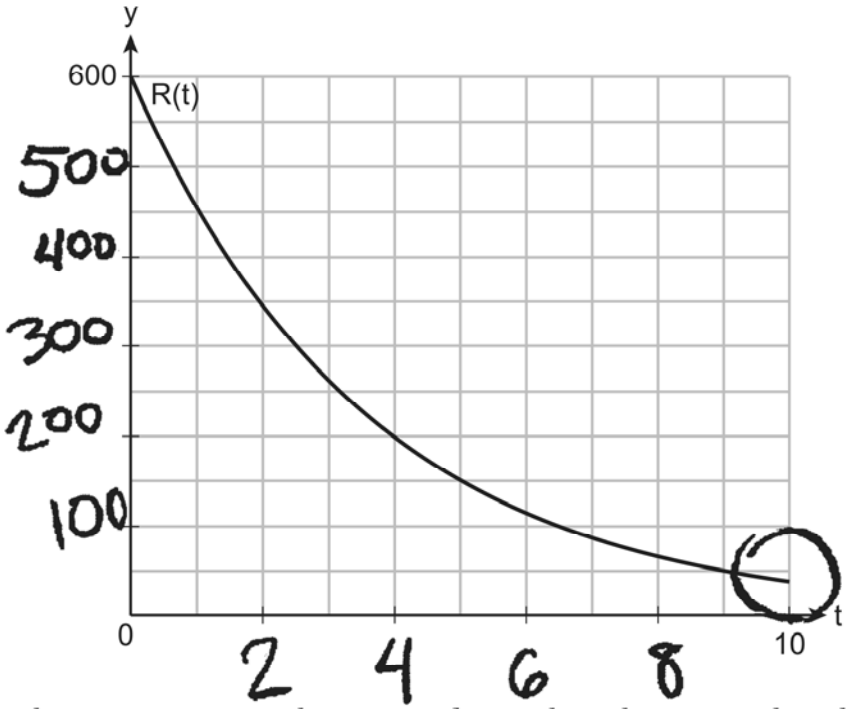
Question 34

34 The breakdown of a drug is modeled by $A(t) = A_0e^{-rt}$, where $A(t)$ is the amount of the drug in the body, A_0 is the initial dosage, r is the rate of decay, and t is the time in hours. A patient is given 450 mg of a drug that has a decay rate of 0.205. Write a function, $A(t)$, to model the amount of the drug remaining in the body after t hours.

$A(t) = 450e^{-(0.205)t}$ Plug into formula

The sketch below shows the function $R(t)$, which models the breakdown of a different drug administered to the same patient.

Graph $A(t)$ on the grid below.



Using the graph, approximate to the *nearest hour* when the patient has the same amount of both drugs remaining.

10th hour, the graph begins to level out.

Score 1: The student wrote a correct exponential function.

Question 34

34 The breakdown of a drug is modeled by $A(t) = A_0e^{-rt}$, where $A(t)$ is the amount of the drug in the body, A_0 is the initial dosage, r is the rate of decay, and t is the time in hours. A patient is given 450 mg of a drug that has a decay rate of 0.205. Write a function, $A(t)$, to model the amount of the drug remaining in the body after t hours.

$A(t) = Ae^{-rt}$ — amount of drug, dosage, rate of decay, time

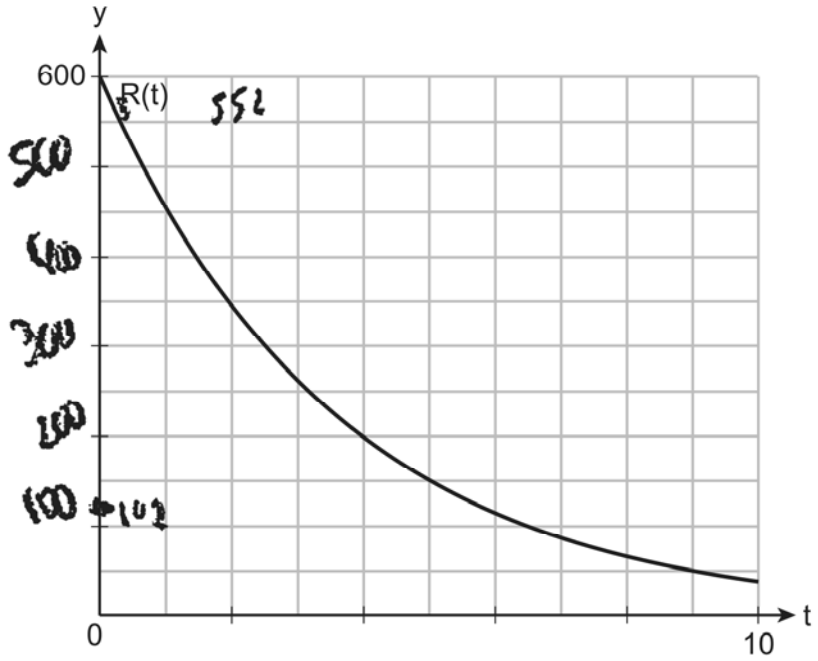
$A(t) = 450e^{-0.205}$

$= 552.38627927$

$A(t) = 552.3$

The sketch below shows the function $R(t)$, which models the breakdown of a different drug administered to the same patient.

Graph $A(t)$ on the grid below.



Using the graph, approximate to the *nearest hour* when the patient has the same amount of both drugs remaining.

1 hr 2 min.

Score 0: The student did not satisfy the criteria for one or more credits.

Question 34

34 The breakdown of a drug is modeled by $A(t) = A_0e^{-rt}$, where $A(t)$ is the amount of the drug in the body, A_0 is the initial dosage, r is the rate of decay, and t is the time in hours. A patient is given 450 mg of a drug that has a decay rate of 0.205. Write a function, $A(t)$, to model the amount of the drug remaining in the body after t hours.

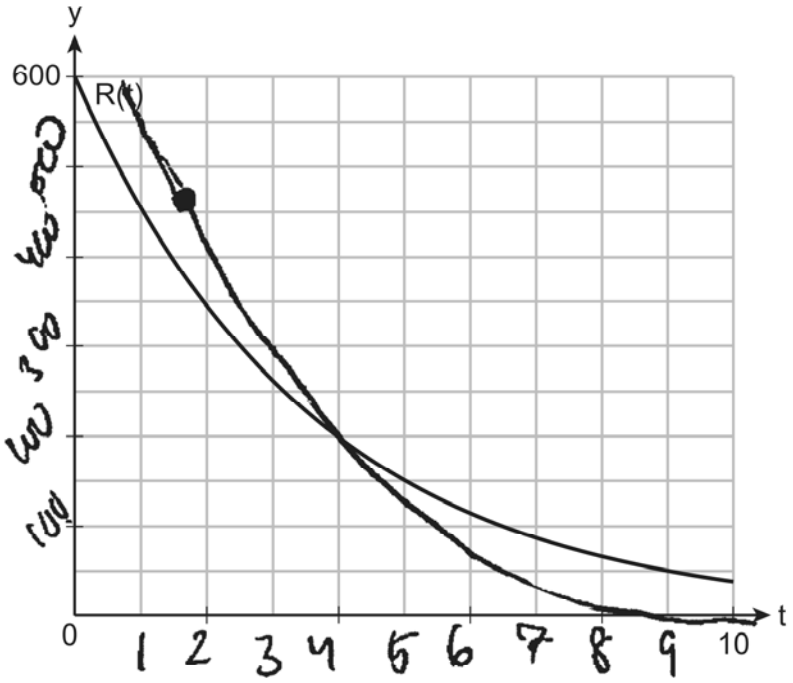
$A(t) = A_0e^{-rt}$

$450 = A_0e^{-(0.205)t}$

The sketch below shows the function $R(t)$, which models the breakdown of a different drug administered to the same patient.

Graph $A(t)$ on the grid below.

$A(t) = 450$ mg.



Using the graph, approximate to the *nearest hour* when the patient has the same amount of both drugs remaining.

$450 = A_0e^{-(0.205)t}$.

$450 = A_0e^{-(0.205)4}$.

$450 = A_0e^{-(0.82)}$.

Score 0: The student did not satisfy the criteria for one or more credits.

Question 35

35 Consider the sinusoidal function below.

$$d(t) = 6800\cos\left(\frac{4}{3}\pi t\right) + 6400$$

State the maximum value of $d(t)$.

$\cos\left(\frac{4}{3}\pi t\right) = 1$

$\frac{4}{3}\pi t = \cos^{-1}(1)$

$\frac{4}{3}\pi t = 0$

$t = 0$

$d(0) = 6800\cos\left(\frac{4}{3}\pi(0)\right) + 6400$

$d(0) = 6800(1) + 6400$

$d(0) = 13200$

State the period of $d(t)$.

$per = \frac{2\pi}{b}$

$per = \frac{2\pi}{4/3\pi}$

$per = 1.5$

Determine the average rate of change from $\frac{3}{4} \le t \le 2$.

$d\left(\frac{3}{4}\right) = 6800\cos\left(\frac{4}{3}\pi\left(\frac{3}{4}\right)\right) + 6400$

$d\left(\frac{3}{4}\right) = 6800(-1) + 6400$

$d\left(\frac{3}{4}\right) = -400$

$d(2) = 6800\cos\left(\frac{4}{3}\pi(2)\right) + 6400$

$d(2) = 2000$

$\frac{f(a)-f(b)}{a-b} = \frac{d(2)-d\left(\frac{3}{4}\right)}{2-\frac{3}{4}}$

$= 2720$

Score 4: The student gave a complete and correct response.

Question 35

35 Consider the sinusoidal function below.

$$d(t) = 6800\cos\left(\frac{4}{3}\pi t\right) + 6400$$

State the maximum value of $d(t)$.

max = c + a

max = 13,200

a = 6800

c = 6400

$b = \frac{4}{3}\pi$

$p = \frac{2\pi}{\frac{4}{3}\pi} = 1.5$

State the period of $d(t)$.

p = 1.5

Determine the average rate of change from $\frac{3}{4} \le t \le 2$.

$d(\frac{3}{4}) = 6800\cos(\frac{4}{3}\pi(\frac{3}{4})) + 6400$

$d(\frac{3}{4}) = -400$

$d(2) = 3000$

$\frac{3000 + 400}{2 - .75} = 2720$

Score 4: The student gave a complete and correct response.

Question 35

35 Consider the sinusoidal function below.

$$d(t) = 6800\cos\left(\frac{4}{3}\pi t\right) + 6400$$

State the maximum value of $d(t)$.

$d(0) = 6800\cos\left(\frac{4}{3}\pi(0)\right) + 6400$

$d(0) = 13200$

State the period of $d(t)$.

graph → table →

x	y
-3	13200
-2	3000
-1	3000
0	13200
1	3000
2	3000
3	13200

period → 3

Determine the average rate of change from $\frac{3}{4} \le t \le 2$.

$d\left(\frac{3}{4}\right) = 6800\cos\left(\frac{4}{3}\pi\left(\frac{3}{4}\right)\right) + 6400$

$d\left(\frac{3}{4}\right) = -400$

$d(2) = 6800\cos\left(\frac{4}{3}\pi(2)\right) + 6400$

$d(2) = 3000$

$$\frac{3000 - (-400)}{2 - \frac{3}{4}} = \frac{3400}{1.25} = 2720$$

Score 3: The student did not state a correct period.

Question 35

35 Consider the sinusoidal function below.

$$d(t) = 6800\cos\left(\frac{4}{3}\pi t\right) + 6400$$

State the maximum value of $d(t)$.

value is 6800 amplitude

State the period of $d(t)$.

$t = \frac{2\pi}{B}$ $\quad t = \frac{2\pi}{(4/3\pi)} = \frac{3}{2}$

Determine the average rate of change from $\frac{3}{4} \le t \le 2$.

$2 - 3/4 = \frac{5}{4}$

$d(2) - d(3/4) = 3400$

$3400/(5/4) = 2720$

Score 3: The student wrote an incorrect maximum value.

Question 35

35 Consider the sinusoidal function below.

$$d(t) = 6800\cos\left(\frac{4}{3}\pi t\right) + 6400$$

State the maximum value of $d(t)$.

$d(t) = 6800\cos(4/3\pi t) + 6400$

$d(1.5) = 6800\cos(4/3\pi(-1.5)) + 6400$

MAX = 13057

State the period of $d(t)$.

$B = 2\pi P$, $P = 2\pi B$

$\frac{(4/3\pi)}{2\pi} = \frac{2\pi}{2\pi}B$ $P = 2\pi(4/3\pi)$

$2/3 = B$

Determine the average rate of change from $\frac{3}{4} \le t \le 2$. (x_1 x_2)

$d(t) = 6800\cos(4/3\pi(3/4)) + 6400$

y_1 $d(t) = -400$

$d(t) = 6800\cos(4/3\pi(2)) + 6400$

y_2 $d(t) = 3000$

$\frac{y_2 - y_1}{x_2 - x_1} = \frac{3000 - -400}{2 - (3/4)} =$

$\frac{3400}{1.25} = \boxed{2720}$

Score 2: The student determined the average rate of change correctly.

Question 35

35 Consider the sinusoidal function below.

$$d(t) = 6800\cos\left(\frac{4}{3}\pi t\right) + 6400$$

State the maximum value of $d(t)$.

6800 + 6400 = 13200

State the period of $d(t)$.

$P = \frac{2\pi}{b}$

$P = \frac{2\pi}{4/3} \cdot \frac{3}{3}$

$P = \frac{6\pi}{4} = 1\frac{2\pi}{2}$

Determine the average rate of change from $\frac{3}{4} \le t \le 2$.

$d(\frac{3}{4}) = 6800\cos(\frac{4}{3}\pi(\frac{3}{4})) + 6400 = -400$ 8000

$d(2) = 6800\cos(\frac{4}{3}\pi(2)) + 6400 =$ ~~6058.245798~~

8000

$(\frac{3}{4}, -400)$

$(2, 3000)$

~~6058.245~~ + 400

$2 - \frac{3}{4}$

$\frac{3400}{1.25} = 2400$

Score 2: The student wrote an incorrect period and made a computational error to determine the average rate of change.

Question 35

35 Consider the sinusoidal function below.

$$d(t) = 6800\cos\left(\frac{4}{3}\pi t\right) + 6400$$

State the maximum value of $d(t)$.

6400 + 6800

13200

State the period of $d(t)$.

$\frac{2\pi}{\frac{4}{3}}$ $2\pi \cdot \frac{3}{4} = \frac{12}{12} = \frac{3\pi}{4}$

Determine the average rate of change from $\frac{3}{4} \le t \le 2$.

$6800\cos\left(\frac{4}{3}\pi\left(\frac{3}{4}\right)\right) + 6400$

$$\frac{13184.78062 - 13127.44005}{\frac{3}{4} - 2}$$

$$\frac{62.34}{-1.25} = 49.87$$

Score 1: The student stated a correct maximum value.

Question 35

35 Consider the sinusoidal function below.

$$d(t) = 6800\cos\left(\frac{4}{3}\pi t\right) + 6400$$

State the maximum value of $d(t)$.

13,200

State the period of $d(t)$.

$\frac{4}{3} \cdot \frac{\pi}{2} = 2$

Determine the average rate of change from $\frac{3}{4} \leq t \leq 2$.

$d\left(\frac{3}{4}\right) = 6800\cos\left(\frac{4}{3}\pi\left(\frac{3}{4}\right)\right) + 6400 = -400$

$d(2) = 6800\cos\left(\frac{4}{3}\pi(2)\right) + 6400 = +8000$

2600

$\frac{2600}{2} = 1300$

Score 1: The student stated a correct maximum value.

Question 35

35 Consider the sinusoidal function below.

$$d(t) = 6800\cos\left(\frac{4}{3}\pi t\right) + 6400$$

State the maximum value of $d(t)$.

$6800\cos\left(\frac{4}{3}\pi 10\right)+6400$

$d(10)=6800\cos\left(\frac{4}{3}\pi t\right)+6400$

$d(10)=11462.22728$

State the period of $d(t)$.

$\cos 6800 = 0.766$

$d(.766) = 6800\cos\left(\frac{4}{3}\pi .766\right)+6400$

$d(.766) = 13189.34$

Determine the average rate of change from $\frac{3}{4} \le t \le 2$.

- $\frac{3}{4}$ less than or = to T
- T is less than or equal to 2

$2-\frac{3}{4}=1.25$

Score 0: The student did not satisfy the criteria for one or more credits.

Question 35

35 Consider the sinusoidal function below.

$$d(t) = 6800\cos\left(\frac{4}{3}\pi t\right) + 6400$$

State the maximum value of $d(t)$.

6800

State the period of $d(t)$.

$\frac{2\pi}{\frac{4}{3}\pi} = 9.8$

Determine the average rate of change from $\frac{3}{4} \leq t \leq 2$.

greater or same as $\frac{3}{4}$ less or same as 2.

Score 0: The student did not satisfy the criteria for one or more credits.

Question 36

36 Solve algebraically for all values of m:

$$m - 2\sqrt{4m - 3} = 3$$

$m - 2\sqrt{4m-3} = 3$

$-m \qquad\qquad -m$

$\frac{-2\sqrt{4m-3}}{-2} = \frac{3-m}{-2}$

$\left(\sqrt{4m-3}\right)^2 = \left(\frac{-3}{2} + \frac{m}{2}\right)^2$

$4m - 3 = \left(\frac{-3}{2} + \frac{m}{2}\right)\left(\frac{-3}{2} + \frac{m}{2}\right)$

$(4m-3)^{\cdot 4} = \left(\frac{9}{4} - \frac{3m}{4} - \frac{3m}{4} + \frac{m^2}{4}\right)^{\cdot 4}$

$16m - 12 = 9 - 6m + m^2$

$-16m + 12$

$0 = m^2 - 22m + 21$

$(m-1)(m-21) = 0$

$m - 1 = 0$ $\quad +1$ $\quad m = 1$

$m - 21 = 0$ $\quad +21$ $\quad m = 21$

Extraneous solution

– Check –

$m - 2\sqrt{4m-3} = 3$

$1 \rightarrow m \quad -1 \neq 3$ ✗

$21 \rightarrow m \quad 3 = 3$ ✓

Score 4: The student gave a complete and correct response.

Question 36

36 Solve algebraically for all values of m:

$$m - 2\sqrt{4m - 3} = 3$$

$-m$

$$3 - m = -2\sqrt{4m-3}$$

-1

$$(-3 + m = 2\sqrt{4m-3})^2$$

$$(-3+m)(-3+m) = 4(4m-3)$$

$$9 - 6m + m^2 = 16m - 12$$

$$-16m + 12$$

$$m^2 - 22m + 21 = 0$$

$1 \to a$

$-22 \to b$

$21 \to c$

$d = b^2 - 4ac = 400$

$$\frac{22 \pm \sqrt{400}}{2}$$

$m = 21$

~~$m = 1$~~

Check

$21 \to m$

$m - 2\sqrt{4m-3} = 3$

$3 = 3$ ✓

$1 \to m$

$m - 2\sqrt{4m-3} = 3$

$-1 \neq 3$ ✗

Score 4: The student gave a complete and correct response.

Question 36

36 Solve algebraically for all values of m:

$$m - 2\sqrt{4m - 3} = 3$$

$\frac{-2\sqrt{4m-3}}{-2} = \frac{3-m}{-2}$

$\left(\sqrt{4m-3}\right)^2 = \left(\frac{3}{2} - \frac{1}{2}m\right)^2$

$-\frac{3}{2}\left(-\frac{3}{2}-\frac{1}{2}m\right) - \frac{1}{2}m\left(-\frac{3}{2}-\frac{1}{2}m\right)$

$\frac{9}{4} + \frac{3}{4}m + \frac{3}{4}m + \frac{1}{4}m^2$

$4m-3 = \frac{1}{4}m^2 + \frac{3}{2}m + \frac{9}{4}$

$\frac{1}{4}m^2 - \frac{5}{2}m + \frac{21}{4}$

$\frac{1}{4}(m^2 - 10m + 21)$

$\frac{1}{4}(m-7)(m-3) = 0$

$m=7 \quad m=3$

Check

$7 - 2\sqrt{4(7)-3} \stackrel{?}{=} 3$

$-3 \neq 3$

$3 - 2\sqrt{4(3)-3} \stackrel{?}{=} 3$

$-3 \neq 3$

no solutions

Score 3: The student made a computational error when dividing by −2.

Question 36

36 Solve algebraically for all values of m:

$$m - 2\sqrt{4m - 3} = 3$$

$m - 2\sqrt{4m-3} = 3$

$-2\sqrt{4m-3} = 3 - m$

$4(4m-3) = 9 - 6m + m^2$

$16m - 12 = 9 - 6m + m^2$

$16m - 12 - 9 + 6m - m^2 = 0$

$(16m + 6m) - 12 - 9 - m^2 = 0$

$-m^2 + 22m - 21 = 0$

$+m^2 - m - 21m + 21 = 0$

$m(m-1) - 21(m-1) = 0$

$(m-1)(m-21) = 0$

$m - 1 = 0$

$+1 \quad +1$

$m = 1$

$m - 21 = 0$

$+21 \quad +21$

$m = 21$

$m - 1 = 0$

$m - 21 = 0$

$21 - 2$

$21 - 2\sqrt{81} = 3$

$21 - 2 \cdot 9 = 3$

Score 3: The student did not reject the extraneous root.

Question 36

36 Solve algebraically for all values of m:

$$m - 2\sqrt{4m - 3} = 3$$

$m = 2\sqrt{4m-3} + 3$

$m - 3 = 2\sqrt{4m-3}$

$(m-3)(m-3)$ $\left(\frac{m-3}{2}\right)^2 = \left(\sqrt{4m-3}\right)^2$

$\frac{(m-3)^2}{(2)^2} = 4m - 3$

$\frac{m^2-6m+9}{4} = 4m - 3$

$\frac{m^2-6m+21}{4} = 4m$

$m^2 - 6m + 21 = 16m$

$m^2 - 22m + 21 = 0$

$(m-21)(m-1)$

$m = \{-21, -1\}$

Score 2: The student solutions are incorrect and were not rejected.

Question 36

36 Solve algebraically for all values of m:

$$m - 2\sqrt{4m - 3} = 3$$

$-m \quad -m$

$$\frac{-2\sqrt{4m-3}}{-2} = \frac{-m+3}{-2}$$

$$\left(\sqrt{4m-3}\right)^2 = \left(\frac{1}{2}m + \frac{3}{2}\right)^2$$

$$\left(\tfrac{1}{2}m - \tfrac{3}{2}\right)\left(\tfrac{1}{2}m - \tfrac{3}{2}\right)$$

$$4m - 3 = \frac{1}{4}m^2 - \frac{6}{4}m + \frac{9}{4}$$

$-4m \quad -3 \qquad\qquad -4m \quad -3$

$$\frac{1}{4}m^2 - \frac{22}{4} - \frac{3}{4} = 0$$

$$x = \frac{\frac{22}{4} \pm \sqrt{\left(\frac{-22}{4}\right)^2 - 4\left(\frac{1}{4}\right)\left(-\frac{3}{4}\right)}}{2\left(\frac{1}{4}\right)}$$

$$x = \frac{\frac{22}{4} \pm \sqrt{31}}{\frac{2}{4}}$$

$$\left\{11 \pm \frac{2}{4}\sqrt{31}\right\} \qquad 11 \pm \frac{2}{4}\sqrt{31}$$

Score 1: The student received one credit for correctly squaring both sides.

Question 36

36 Solve algebraically for all values of m:

$$m - 2\sqrt{4m - 3} = 3$$

$m - 2\sqrt{4m-3} = 3$
$-m+2 \qquad -m+2$
$(\sqrt{4m-3})^2 = (m+5)^2$
$4m-3 = (-m+5)(-m+5)$
$4m-3 = m^2-5m-5m+25$
$4m-3 = m^2-10m+25$
$-4m+3 \qquad -4m+3$
$0 = m^2-16m+28$
$(m-14)(m-2) = 0$
$m = 14$
$m = 2$

Score 1: The student made a conceptual error and one computational error.

Question 36

36 Solve algebraically for all values of m:

$$m - 2\sqrt{4m - 3} = 3$$

$m - 2\sqrt{4m-3} = 3$
$-m+2 \qquad -m+2$

$\sqrt{4m-3} = 3-m+2$

$\sqrt{4m-3}^2 = 5-m^2$

$4m-3 = (5-m)(5-m)$

$4m-3 = 25-5m-5m+m^2$

$4m-3 = m^2-10m+25$
$-4 \quad +3 \qquad +3$

$4m = m^2-10m+27$
$+10m \qquad +10m$

$14m = m^2+27$
$-14m \qquad -14m$

$m^2-14m+27$
$a \quad b \quad c$

$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$

$x = \frac{-(14) \pm \sqrt{(-14)^2-4(1)(27}}{2(1)}$

$x = \frac{14 \pm \sqrt{196-108}}{2}$

$x = \frac{14 \pm \sqrt{88}}{2}$

$x = \frac{14 \pm 2\sqrt{44}}{2}$

$x = 7 \pm 2\sqrt{44}$

CV

$x = 7+2\sqrt{44}$

88	
2	44
4	22
8	11

Score 0: The student did not satisfy the criteria for one or more credits.

Question 36

36 Solve algebraically for all values of m:

$m - 2\sqrt{4m - 3} = 3$

$-m \qquad\qquad = -m$

$\frac{-2\sqrt{4m-3}}{-2} \quad \frac{3-m}{-2}$

$(\sqrt{4m-3})^2 = \left(\frac{3-m}{-2}\right)^2$

$\frac{4m-3}{1} = \frac{2(3-m)}{-4}$

$\frac{2(3-m)}{2} = \frac{-4(4m-3)}{2}$

$3-m = -2(4m-3$

$3-m = -8m+6$

$-6 \qquad\quad -6$

$-3-m = -8m$

$+m \quad +m$

$\frac{-3}{-7} = \frac{-7m}{-7}$

$m = \frac{3}{7}$

Score 0: The student's response does not contain enough course-level work to receive any credit.

Question 37

37 Xander and Yvette are each practicing for their road tests. Xander decides to drive for 15 minutes the first day and plans to increase the amount of time he spends driving by five minutes each day leading up to the day of his test. Yvette decides to drive for 10 minutes the first day, and she plans to increase the amount of time she spends driving by 15% each day leading up to the day of her test.

d=5

r = 1.15

State whose plan for the amount of time driving per day can be modeled by an arithmetic sequence, and whose plan can be modeled by a geometric sequence. Explain your reasoning.

Xander's plan can be modeled using an arithmetic sequence because his plan is characterized by a common difference each day. Yvette's plan can be modeled by a geometric sequence, because her plan is characterized by a common ratio.

Write an equation for x_n that represents the amount of time spent driving on the nth day for Xander's plan and an equation for y_n that represents the amount of time spent driving on the nth day for Yvette's plan.

$x_n = 15 + 5(n-1)$

$x_n = 5n + 10$

$y_n = 10 \cdot 1.15^{n-1}$

$y_n = 10(1.15)^{n-1}$

Who will spend more time driving on the 19th day of practicing? Justify your answer.

$x_{19} = 5(19) + 10$

$x_{19} = 105$

$y_{19} = 10 \cdot 1.15^{18}$

$y_{19} = 123.75$

Yvette

Score 6: The student gave a complete and correct response.

Question 37

37 Xander and Yvette are each practicing for their road tests. Xander decides to drive for 15 minutes the first day and plans to increase the amount of time he spends driving by five minutes each day leading up to the day of his test. Yvette decides to drive for 10 minutes the first day, and she plans to increase the amount of time she spends driving by 15% each day leading up to the day of her test.

State whose plan for the amount of time driving per day can be modeled by an arithmetic sequence, and whose plan can be modeled by a geometric sequence. Explain your reasoning.

Xander's plan can be modeled by an arithmetic sequence because the time is incremented by 5 minutes whereas Yvette's plan can be modeled by a geometric sequence because her time is multiplied by 1.15 each day.

Write an equation for x_n that represents the amount of time spent driving on the nth day for Xander's plan and an equation for y_n that represents the amount of time spent driving on the nth day for Yvette's plan.

$$x_n = 15 + (n-1)5$$

$$y_n = 10(1.15)^{n-1}$$

Who will spend more time driving on the 19th day of practicing? Justify your answer.

$x_{19} = 15 + (19-1)5 = 105$ minutes

$y_{19} = 10(1.15)^{19-1} \approx 124$ minutes

Yvette will spend more time driving on the 19th day

Score 6: The student gave a complete and correct response.

Question 37

37 Xander and Yvette are each practicing for their road tests. Xander decides to drive for 15 minutes the first day and plans to increase the amount of time he spends driving by five minutes each day leading up to the day of his test. Yvette decides to drive for 10 minutes the first day, and she plans to increase the amount of time she spends driving by 15% each day leading up to the day of her test.

State whose plan for the amount of time driving per day can be modeled by an arithmetic sequence, and whose plan can be modeled by a geometric sequence. Explain your reasoning.

Xander can be modeled by an arithmetic sequence. because it add 5 minutes each day.
Yvette can be modeled by a Geometric sequence because it multiply the amount of 15% which is 0.15, then add 1 to get the rate. The rate multiply previous number to get next number.

Write an equation for x_n that represents the amount of time spent driving on the nth day for Xander's plan and an equation for y_n that represents the amount of time spent driving on the nth day for Yvette's plan.

Xander:

$x_n = 15 + 5(n-1)$

Yvette:

$y_n = 10(1.15)^{n-1}$

Who will spend more time driving on the 19th day of practicing? Justify your answer.

Xander:

$x_{19} = 15 + 5(19-1)$
$= 15 + 105$
$= 120$

Yvette:

$y_{19} = 10(1.15)^{19-1}$
$= 10(1.15)^{18}$
≈ 123.75

Yvette speed more time with 123.75 minute on the 19th day of practicing.

Score 5: The student made a computational error calculating Xander's time in the last part.

Question 37

37 Xander and Yvette are each practicing for their road tests. Xander decides to drive for 15 minutes the first day and plans to increase the amount of time he spends driving by five minutes each day leading up to the day of his test. Yvette decides to drive for 10 minutes the first day, and she plans to increase the amount of time she spends driving by 15% each day leading up to the day of her test.

State whose plan for the amount of time driving per day can be modeled by an arithmetic sequence, and whose plan can be modeled by a geometric sequence. Explain your reasoning.

Xander's plan can be modeled by an arithmetic sequence because it is increasing with addition by a fixed number. Yvette's plan can be modeled by a geometric sequence, as it is increasing with multiplication by a not set number.

Write an equation for x_n that represents the amount of time spent driving on the nth day for Xander's plan and an equation for y_n that represents the amount of time spent driving on the nth day for Yvette's plan.

$x_n = x_1 + (n-1)d$

$x_n = 15 + (n-1)5$

$y_n = y_1 \cdot r^{n-1}$

$y_n = 10 \cdot 1.15^{n-1}$

Who will spend more time driving on the 19th day of practicing? Justify your answer.

$x_{19} = 15 + (19-1)5$

$x_{19} = 105$ mins

$y_{19} = 10 \cdot 1.15^{(19-1)}$

$y_{19} \approx 123.7545361$ mins

≈ 124 mins

$124 > 105$

Yvette, she will spend approximately 19 more minutes practicing than Xander.

Score 5: The student gave an incomplete explanation for Yvette in the first part.

Question 37

37 Xander and Yvette are each practicing for their road tests. Xander decides to drive for 15 minutes the first day and plans to increase the amount of time he spends driving by five minutes each day leading up to the day of his test. Yvette decides to drive for 10 minutes the first day, and she plans to increase the amount of time she spends driving by 15% each day leading up to the day of her test.

State whose plan for the amount of time driving per day can be modeled by an arithmetic sequence, and whose plan can be modeled by a geometric sequence. Explain your reasoning.

Xander's time can be modeled as a arithmetic sequence because it have a common difference.

Yvette's time can be modeled as a geometric sequence because it has a common ratio

Write an equation for x_n that represents the amount of time spent driving on the nth day for Xander's plan and an equation for y_n that represents the amount of time spent driving on the nth day for Yvette's plan.

$X_n = 15 + 5(n)$

$Y_n = 10(1.15)^n$

Who will spend more time driving on the 19th day of practicing? Justify your answer.

$X_{19} = 15 + 5(19)$ $\quad X_{19} = 110$

$Y_{19} = 10(1.15)^{19}$ $\quad Y_{19} = 142.31$

Score 4: The student used n instead of $n - 1$ in the second part and did not answer the question in the third part.

Question 37

37 Xander and Yvette are each practicing for their road tests. Xander decides to drive for 15 minutes the first day and plans to increase the amount of time he spends driving by five minutes each day leading up to the day of his test. Yvette decides to drive for 10 minutes the first day, and she plans to increase the amount of time she spends driving by 15% each day leading up to the day of her test.

State whose plan for the amount of time driving per day can be modeled by an arithmetic sequence, and whose plan can be modeled by a geometric sequence. Explain your reasoning.

Xander's plan can be modeled by an arithmetic sequence since he's adding the same number of minutes each time. Yvette's plan can be modeled by a geometric sequence since her time is multiplying by a percent.

Write an equation for x_n that represents the amount of time spent driving on the nth day for Xander's plan and an equation for y_n that represents the amount of time spent driving on the nth day for Yvette's plan.

$x_n = 15 + (n-1)(5)$

$y_n = 10(1.15)^{n-1}$

Who will spend more time driving on the 19th day of practicing? Justify your answer.

Xander will.

Score 4: The student received no credit on the third part.

Question 37

37 Xander and Yvette are each practicing for their road tests. Xander decides to drive for 15 minutes the first day and plans to increase the amount of time he spends driving by five minutes each day leading up to the day of his test. Yvette decides to drive for 10 minutes the first day, and she plans to increase the amount of time she spends driving by 15% each day leading up to the day of her test.

State whose plan for the amount of time driving per day can be modeled by an arithmetic sequence, and whose plan can be modeled by a geometric sequence. Explain your reasoning.

Xander can be modeled by arithmetic sequence as there is a given number to add by

Yvette can be modeled by geometric sequence as her time increases by percentage so to get a number have to multiply the percentage

Write an equation for x_n that represents the amount of time spent driving on the nth day for Xander's plan and an equation for y_n that represents the amount of time spent driving on the nth day for Yvette's plan.

Xander: $15 + (n-1)5$ (15 = a_1, 5 = day)

Yvette: $10 \cdot .15^{n-1}$ (a_1, R, $n-1$)

Who will spend more time driving on the 19th day of practicing? Justify your answer.

Xander: $15 + (5)18 = 105$

Yvette: $10 \cdot .15^{18} = 82$

$a_2 = 11.5$

Xander as he has the higher number

Score 3: The student received two points in the first part and one point in the third part.

Question 37

37 Xander and Yvette are each practicing for their road tests. Xander decides to drive for 15 minutes the first day and plans to increase the amount of time he spends driving by five minutes each day leading up to the day of his test. Yvette decides to drive for 10 minutes the first day, and she plans to increase the amount of time she spends driving by 15% each day leading up to the day of her test.

State whose plan for the amount of time driving per day can be modeled by an arithmetic sequence, and whose plan can be modeled by a geometric sequence. Explain your reasoning.

– Xander's plan can be modeled as arithmetic sequence since he is increasing the amount of time by 5 minutes.

– Yvette's plan can be modeled as geometric sequence.

Write an equation for x_n that represents the amount of time spent driving on the nth day for Xander's plan and an equation for y_n that represents the amount of time spent driving on the nth day for Yvette's plan.

$x_n = a_1 + d(n-1)$

$15 + 5(n-1)$

$y_n = a_1 r^{n-1}$

$10 r^{n-1}$

Who will spend more time driving on the 19th day of practicing? Justify your answer.

$x_n = 15 + 5(19-1)$

$= 105$

$y_n = 10$

Score 2: The student received one credit on the first part for Xander's explanation and one credit on the second part.

Question 37

37 Xander and Yvette are each practicing for their road tests. Xander decides to drive for 15 minutes the first day and plans to increase the amount of time he spends driving by five minutes each day leading up to the day of his test. Yvette decides to drive for 10 minutes the first day, and she plans to increase the amount of time she spends driving by 15% each day leading up to the day of her test.

State whose plan for the amount of time driving per day can be modeled by an arithmetic sequence, and whose plan can be modeled by a geometric sequence. Explain your reasoning.

Xander 105

Xander's can be modeled using an arithmetic sequence b/c it's adding 5 every day.
Yvette can be a geometric b/c it's going up by a 5% each time

Write an equation for x_n that represents the amount of time spent driving on the nth day for Xander's plan and an equation for y_n that represents the amount of time spent driving on the nth day for Yvette's plan.

$15 + 5(x_n)$
$10 + .15(y_n)$

Who will spend more time driving on the 19th day of practicing? Justify your answer.

Yvette will be higher.

Score 1: The student received one credit on the first part.

Question 37

37 Xander and Yvette are each practicing for their road tests. Xander decides to drive for 15 minutes the first day and plans to increase the amount of time he spends driving by five minutes each day leading up to the day of his test. Yvette decides to drive for 10 minutes the first day, and she plans to increase the amount of time she spends driving by 15% each day leading up to the day of her test.

State whose plan for the amount of time driving per day can be modeled by an arithmetic sequence, and whose plan can be modeled by a geometric sequence. Explain your reasoning.

Xander is arithmetic sequence

Yvette is geometric sequence

Write an equation for x_n that represents the amount of time spent driving on the nth day for Xander's plan and an equation for y_n that represents the amount of time spent driving on the nth day for Yvette's plan.

$$X_n = 15 + (n-1)5$$

$$Y_n = 10(.15)^{n-1}$$

Who will spend more time driving on the 19th day of practicing? Justify your answer.

Yvette will spend more time driving

Score 1: The student received one credit on the second part.

Question 37

37 Xander and Yvette are each practicing for their road tests. Xander decides to drive for 15 minutes the first day and plans to increase the amount of time he spends driving by five minutes each day leading up to the day of his test. Yvette decides to drive for 10 minutes the first day, and she plans to increase the amount of time she spends driving by 15% each day leading up to the day of her test.

State whose plan for the amount of time driving per day can be modeled by an arithmetic sequence, and whose plan can be modeled by a geometric sequence. Explain your reasoning.

Xander's plan can be modeled by a geometric sequence because he only uses numbers.
Yvette's plan can be modeled by an arithmetic sequence because she uses percentages.

Write an equation for x_n that represents the amount of time spent driving on the nth day for Xander's plan and an equation for y_n that represents the amount of time spent driving on the nth day for Yvette's plan.

$x_n(15+5)$

$y_n(10+15\%)$

Who will spend more time driving on the 19th day of practicing? Justify your answer.

$\frac{a}{10} = \frac{15}{100}$

$100a = 15 \cdot 10$

$\frac{100a}{100} = \frac{150}{100}$

$a = 1.5$

X: $19(15+5) = 380\text{min}$ Xander

Y: $19(10+15\%)$

$19(10+1.5) = 218.5\text{min}$

Score 0: The student did not satisfy the criteria for one or more credits.

Question 37

37 Xander and Yvette are each practicing for their road tests. Xander decides to drive for 15 minutes the first day and plans to increase the amount of time he spends driving by five minutes each day leading up to the day of his test. Yvette decides to drive for 10 minutes the first day, and she plans to increase the amount of time she spends driving by 15% each day leading up to the day of her test.

State whose plan for the amount of time driving per day can be modeled by an arithmetic sequence, and whose plan can be modeled by a geometric sequence. Explain your reasoning.

Xander's can be modeled by the geometric bc it's more simple than Yvettes

Write an equation for x_n that represents the amount of time spent driving on the nth day for Xander's plan and an equation for y_n that represents the amount of time spent driving on the nth day for Yvette's plan.

Xander

$n = x + 5$

Yvette

$n = n(15\%)$

Who will spend more time driving on the 19th day of practicing? Justify your answer.

xander

1 - 15
2 - 20
3 - 25
4 - 30
5 - 35
6 - 40
7 - 45
8 - 50
9 - 55
10 - 60
11 - 65
12 - 70
13 - 75
14 - 80
15 - 85
16 - 90
17 - 95
18 - 100
19 - 105

Yvette

1 - 10
2 - 11.5
3 - 13.22
4 -
5 -
6 -
7 -
8 -
9 -
10 -
11 -
12 -
13 -
14 -
15 -
16 -
17 -
18 -
19 -

Score 0: The student did not satisfy the criteria for one or more credits.

The State Education Department / The University of the State of New York

Regents Examination in Algebra II – JANUARY 2026

Chart for Converting Total Test Raw Scores to Final Exam Scores (Scale Scores)

(Use for the January 2026 exam only.)

Raw Score	Scale Score	Performance Level
86	**100**	5
85	**99**	5
84	**98**	5
83	**97**	5
82	**96**	5
81	**95**	5
80	**94**	5
79	**93**	5
78	**93**	5
77	**92**	5
76	**91**	5
75	**91**	5
74	**90**	5
73	**89**	5
72	**89**	5
71	**88**	5
70	**88**	5
69	**87**	5
68	**87**	5
67	**86**	5
66	**86**	5
65	**86**	5
64	**85**	5
63	**84**	4
62	**84**	4
61	**83**	4
60	**83**	4
59	**83**	4
58	**82**	4

Raw Score	Scale Score	Performance Level
57	**82**	4
56	**82**	4
55	**81**	4
54	**81**	4
53	**80**	4
52	**80**	4
51	**80**	4
50	**79**	4
49	**79**	4
48	**79**	4
47	**78**	4
46	**78**	4
45	**77**	3
44	**77**	3
43	**77**	3
42	**76**	3
41	**76**	3
40	**75**	3
39	**75**	3
38	**74**	3
37	**74**	3
36	**73**	3
35	**73**	3
34	**72**	3
33	**71**	3
32	**71**	3
31	**70**	3
30	**69**	3
29	**68**	3

Raw Score	Scale Score	Performance Level
28	**67**	3
27	**66**	3
26	**65**	3
25	**64**	2
24	**62**	2
23	**61**	2
22	**60**	2
21	**58**	2
20	**55**	2
19	**54**	1
18	**53**	1
17	**51**	1
16	**49**	1
15	**47**	1
14	**45**	1
13	**42**	1
12	**40**	1
11	**37**	1
10	**34**	1
9	**31**	1
8	**28**	1
7	**25**	1
6	**22**	1
5	**19**	1
4	**15**	1
3	**11**	1
2	**8**	1
1	**4**	1
0	**0**	1

To determine the student's final examination score (scale score), find the student's total test raw score in the column labeled "Raw Score" and then locate the scale score that corresponds to that raw score. The scale score is the student's final examination score. Enter this score in the space labeled "Scale Score" on the student's answer sheet.

Schools are not permitted to rescore any of the open-ended questions on this exam after each question has been rated once, regardless of the final exam score. Schools are required to ensure that the raw scores have been added correctly and that the resulting scale score has been determined accurately.

Because scale scores corresponding to raw scores in the conversion chart change from one administration to another, it is crucial that for each administration the conversion chart provided for that administration be used to determine the student's final score. The chart above is usable only for this administration of the Regents Examination in Algebra II.